SUGARCANE RESEARCH

Annual Progress Report

1985

LOUISIANA
AGRICULTURAL
EXPERIMENT STATION
LOUISIANA STATE UNIVERSITY AGRICULTURAL CENTER

SUGARCANE RESEARCH

ANNUAL PROGRESS REPORT

1985

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LOUISIANA AGRICULTURAL EXPERIMENT STATION
DR. C. ORAN LITTLE, VICE CHANCELLOR OF RESEARCH AND DIRECTOR

LOUISIANA STATE UNIVERSITY AGRICULTURAL CENTER
DR. H. ROUSE CAFFEY, CHANCELLOR

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FOREWORD

Research on sugarcane in the Louisiana Agricultural Experiment Station is an integral part of the LSU Agricultural Center's research-extension effort to provide the base knowledge and technology for efficient production and processing of sugarcane. Funds are expended through discipline oriented departments and regionally oriented branch stations.

Scientists working on sugarcane are housed in six departments: Agricultural Economics and Agribusiness, Agricultural Engineering, Agronomy, Entomology, Plant Pathology and Crop Physiology, and the Sugar Station. Most faculty members of the Louisiana Agricultural Experiment Station hold joint appointments with the College of Agriculture, teach at the undergraduate and/or graduate level, and are involved in graduate student training.

Members of the Louisiana Agricultural Experiment Station maintain close working relations with colleagues employed by the Louisiana Cooperative Extension Service, the Agricultural Research Service and Soil Conservation Service of the USDA, American Sugar Cane League, Louisiana Department of Agriculture, Audubon Sugar Institute and other budgetary units of the Baton Rouge Campus.

A major portion of the St. Gabriel Research Station's resources is devoted to sugarcane research. The participation of the Burden Research Plantation, Citrus Research Station, and the Iberia Research Station in helping to accomplish specific sugarcane research objectives in 1985 is acknowledged.

An important part of the 1985 research activities was conducted on cooperating farms throughout the sugarcane industry. The dwindling of farm labor supply has been making the evaluation of location effects increasingly difficult. However, these evaluations are very important and must be continued. The cooperation of the membership of the American Sugar Cane League in accomplishing this research is gratefully acknowledged.

Finally, it must be pointed out that the information in this report is from 1985 only and should be regarded as preliminary. Completed research is reported in appropriate Experiment Station and Extension Service publications and/or other professional publications.

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Sugarcane Field Day Report - 1985

Charles G. Richardson
St. Gabriel Research Station

The Third Annual LSU Area Sugarcane Field Day was held on July 17, 1985 at the St. Gabriel Research Station.

The program began with registration followed by a tour of the sugarcane research plots. During the tour the following topics were discussed: Chemical Treatment of Fallow Land; Seedling Phase of Sugarcane Breeding Program; Comparison of Heat Treated Cane, KLEENTEK® Cane, and RSD Infected Cane; Sugarcane Varieties; Stubble Protection and Shaving.

During the assembly following the field tour, Dr. Denver T. Loupe, Vice Chancellor and Director of Louisiana Cooperative Extension Service, served as Guest Speaker. The County Agents from the participating parishes presented the High Yield Awards for their respective parishes at this time.

The Field Day is a joint effort of the Louisiana Agricultural Experiment Station Sugarcane Research Personnel, St. Gabriel Research Station and Louisiana Cooperative Extension Service Personnel from the parishes of: Iberville, Pointe Coupee, St. John the Baptist, St. James and West Baton Rouge.

I would like to express my appreciation to the host, St. John the Baptist Parish, for serving a very enjoyable meal. There were approximately 300 guests attending the 1985 field day.

Soil Test Activity in the Sugarcane Parishes

Michael C. Amacher
Department of Agronomy

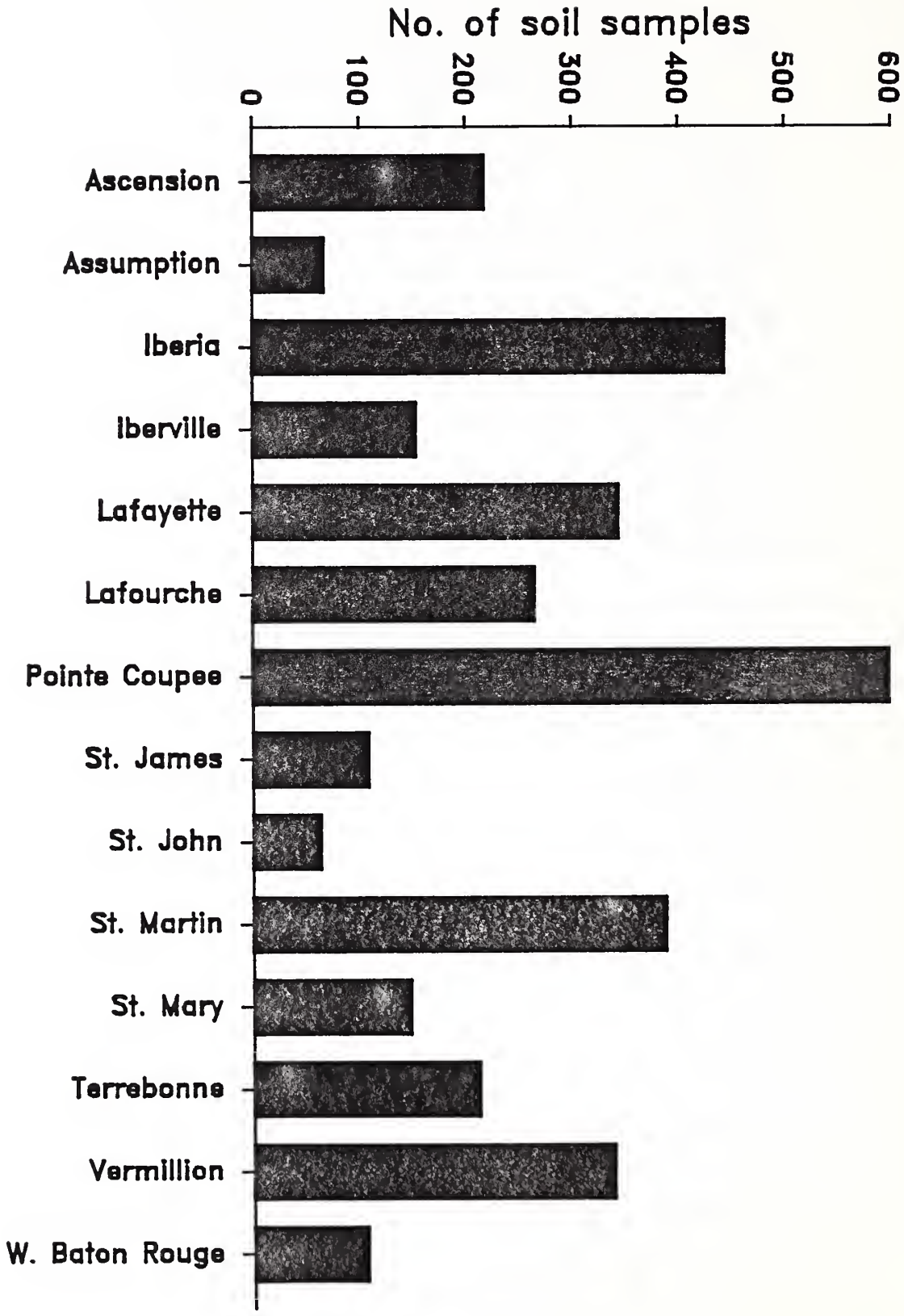
The total number of soil samples analyzed by the Soil Testing Laboratory in 1985 was 25,000. Of this total, 19,900 soil samples were submitted by farmers and home gardeners. The other 5100 soil samples were from research projects of the Louisiana Agricultural Experiment Station. All of the samples were analyzed for extractable phosphorus (Bray 2 method); exchangeable potassium, calcium, and magnesium; pH; organic matter; and texture.

The number of samples received from each of the sugarcane parishes in 1985 is listed in Table 1 and is also shown on the bar graph. The total number of samples received from the parishes in which sugarcane is grown was 3459. This was about 17.4 % of the total number of samples submitted by farmers and home gardeners throughout the state. The percentage of the total for each sugarcane parish is also listed in Table 1.

The sample numbers listed in Table 1 are not limited to just sugarcane field samples. They include samples from fields and gardens for all crops. The number of samples is not large considering the large acreage of cropland in the sugarcane parishes. Thus, it would appear that large areas of cropland are not being sampled at all for soil testing, or are sampled infrequently. Although the use of soil tests by themselves will not guarantee successful soil and crop management, they do serve as a valuable indicator of the fertility status of the soil and can be a useful tool in a soil and crop management program. Therefore, an increase in the use of soil testing in the sugarcane parishes should be promoted. This would result in greater efficiency in the use of fertilizers and better soil and crop management.

Table 1. Number of soil samples submitted to the Soil Test Laboratory from the sugarcane parishes in 1985

Parish	No. of samples	% of total
Ascension	218	1.1
Assumption	67	0.3
Iberia	444	2.2
Iberville	154	0.8
Lafayette	344	1.7
Lafourche	265	1.3
Pointe Coupee	598	3.0
St. James	109	0.5
St. John	64	0.3
St. Martin	388	1.9
St. Mary	148	0.7
Terrebonne	213	1.1
Vermillion	340	1.7
West Baton Rouge	107	0.5
Total	3459	17.4


No. of soil samples
0
100
200
300
400
500
600
Ascension
Assumption
Iberia
Iberville
Lafayette
Lafourche
Pointe Coupee
St. James
St. John
St. Martin
St. Mary
Terrebonne
Vermillion
W. Baton Rouge

SOIL TESTING LABORATORY

M. C. Amacher, R. E. Henderson, C. L. Seale, and K. Stacks

Laboratory Operations

The Agronomy Department operates the Soil Testing Laboratory as a service to farmers to determine the fertility status of soils used for crop production. The fertility status of soils serves as a guide in making recommendations for fertilizer additions to correct deficiencies or to maintain adequate fertility levels in soils for sustained high level production. Cooperative Extension Agents and Specialists use soil test results and information furnished by farmers on cropping and management histories to make specific fertilizer recommendations. Experiment station personnel also use soil test data to monitor the fertility status of soils used in various research projects.

The soil testing service is available to all farmers and experiment station personnel in Louisiana. Mailing and sample boxes and information forms which must accompany each soil sample may be obtained from the Parish Cooperative Extension offices or from the Soil Testing Laboratory, LAES, LSU Ag Center, 128 Madison B. Sturgis Hall, Baton Rouge, LA, 70803.

The 1985 workload of the Soil Test Lab is summarized in Table 1. The total number of samples analyzed was about 2000 samples less than in the previous year. There were also about 2000 less research samples analyzed in 1985 than in 1984. Part of the decrease may be attributed to the fact that the lab was closed for 6 weeks while it moved to the new building. Also a large number of research samples were received near the end of the year. Ordinarily, these samples might be received and analyzed before the end of the year. However, they will be counted with the 1986 samples since they will be completed in 1986. The methods used to analyze the samples are summarized in Table 2.

New Information Forms

A new information form for research samples was introduced in 1984 and was revised in 1985. A copy is included with this report. New information forms for farmer soil samples and irrigation water samples were introduced in 1985. Copies are included with this report.

Computerization of the Soil Test Lab

The computerization of the Soil Test Lab that was begun in 1984 was continued in 1985. Computer programs for processing data and producing reports were developed and put into use in 1984 and were revised in 1985. New programs were developed and put into use in 1985. Computer programs to process data and produce separate reports or printouts of the results are now being used for the following types of samples and analyses:

Sample type	Analyses	Output
Farmer	Routine	Printout of results
Farmer	Optional	Printout of results
Research	Routine	Report
Research	Optional	Report
Irrigation water	pH, salts, Na, Ca, Mg	Report

The printouts of the soil test results for farmer samples are sent to the soil test office where reports are typed to be sent to the Cooperative Extension Service offices for interpretations and recommendations before being sent to the farmers. The research sample and irrigation water quality reports are sent directly to the clients submitting the samples. A sample copy of an irrigation water report form is included with this report.

All of the data produced in the lab is now processed by the computer. This has greatly reduced manual handling of the data. Further improvements in data processing are planned for 1986.

Development of New Soil Test Methods

The research program begun in 1984 to develop and evaluate new soil test methods was continued in 1985 although at a reduced level because of the move to the new building. Because of the seasonal nature of soil testing, virtually all research involving Soil Test Lab personnel must be done during the summer months when the sample workload is light. During August and September, 1985 the lab moved from Wilson Bldg. to Madison B. Sturgis Hall and this limited the amount of research that could be done. No further progress was made on evaluating the new organic matter extraction and CEC methods that were developed the previous year. Progress was made on developing a new buffer for measuring soil acidity and lime requirement and this will be reported here.

A lime incubation study was begun in November, 1984 and continued into 1985 using 42 reference soils. This method will serve as a standard against which buffer lime requirement methods can be compared. Samples of these soils were reacted with saturated $Ca(OH)_2$ solution equivalent to lime rates of 1, 2, 3, 4, and 5 T/A (10 g soil + 25 mL water + 2.5 mL saturated $Ca(OH)_2$ solution for each T/A lime rate) at 25 C for a time period of 90 days. The pH of the soil/lime solution suspensions was measured at 1, 2, 5, 7, 9, 14, 35, 49, and 89 days. The soil suspensions were allowed to dry down and the soil samples were saved for future use.

Examples of the results of the lime/incubation study are shown in Figures 1 and 2 for the Acadia sil. A plot of the soil suspension pH vs the lime rate at each measurement time is shown in Figure 1 and a plot of the pH vs reaction time at each lime rate is shown in Figure 2. The lime requirement method currently used in the Soil Test Lab involves an overnight reaction between soil samples and saturated $Ca(OH)_2$ solution equivalent to 1, 2, and 3 T/A lime. Lime requirement is determined only on soils with a pH of less than 6.1 and only on soils on which crops will be grown that can benefit from lime applications. The lime rates chosen for individual soil samples depend on the pH of the soil and the crop to be grown. For some soils only the 1 T/A rate is used while for others the 2 and sometimes 3 T/A rates are also used. The results are reported as the pH expected after adding lime at the rates used in the overnight laboratory incubation. However, as the data in Figures 1 and 2 clearly show, the pH of the Acadia soil suspensions continued to change after 1 day of reaction at all lime rates. The pH levels of the other soils studied also continued to change after 1 day of reaction. Thus, an overnight reaction time is not sufficient for complete neutralization of soil acidity. Both increases and decreases in pH were observed depending on the soil, lime rate, and reaction time. These changes are caused by a number of competing factors. At short reaction times only the more rapidly reacting soil acidity components are neutralized. Other soil acidity components are neutralized very slowly. The pH of the saturated $Ca(OH)_2$ solution in contact with the soil will decrease over time as the soil acidity is slowly neutralized. However, the increase in microbial activity caused by liming and flooding the soil can slowly increase the pH of the soil solution over time.

Because of the slowness of the reactions between $Ca(OH)_2$ and soil acidity, the absence of a standard reaction time for assessing the neutralization of soil acidity, and the presence of side reactions such as microbial activity, the $Ca(OH)_2$ titration method is not entirely suitable for measuring soil lime requirement. Nevertheless, it is the standard by which all the more rapid buffer methods are evaluated. A number of buffer methods have been developed and are in use by the various soil test labs. Each of these has particular advantages and disadvantages and no one appears suitable for all soil types. The double buffer method developed by Yuan in Florida (Yuan, 1974) accounts for the buffer capacity of each soil and appears suitable for a wide range in soil types. However, it contains two chemicals, pyridine and potassium chromate, that may pose a health hazard to lab personnel and to the environment. Pyridine is volatile and unpleasant to work with and the Cr(VI) species is toxic and not biodegradable. Therefore, it is desirable to develop a modified buffer that has the advantages of the Yuan buffer, but is safer and easier to handle.

The four buffer components of the Yuan buffer are TRIS, imidazol, K_2CrO_4, and pyridine. Titration curves of these components along with other buffers are shown in Figure 3. The other buffers are designated as 2-MBIMDZ (2-methylbenzimidazole), BNZIMDZ (benzimidazole), 8-HDYQNL (8-hydroxyquinoline), 4-MABNZ A (4-methylaminobenzoic acid), and 2,5-DAPRD (2,5-diaminopyridine) on the plot. The titration curves of 2-methylbenzimidazole and benzimidazol are very close to those of pyridine and potassium chromate. These imidazole derivatives show promise as replacements for the two objectionable Yuan buffer components. New buffer mixtures containing the imidazole derivatives as replacements for pyridine and K_2CrO_4 were prepared and adjusted to initial pH levels of approximately 7 and 6. The titration curves of these new buffer mixtures along with titration curves for the original Yuan double buffer are shown in Figure 4. The Yuan buffer is designated as FL for Florida and the new buffer as LA for Louisiana. The numbers 7 and 6 refer to the initial adjusted pH of the buffer. The titration curves for both the FL and LA buffers are linear over the pH ranges of interest, although the titration curve of the new buffer departs from linearity at a pH of about 5 when the initial pH was 6. However, this will probably not detract from its utility. The slopes of these titration curves are shown in Table 3. These buffers have a slope of approximately one over a full pH unit change. That is, 1 mmol of soil acidity is neutralized for each unit change in pH. The pH difference between the initial buffer pH and the buffer pH after reaction with the soil is used as a measure of the soil acidity and therefore the lime required to neutralize it. By using two buffers the individual buffer capacities of the soils can be accounted for over the pH range of interest. This approach is described in detail by Yuan (1974).

The next phase of this study will be to evaluate the new LA buffer. Soil acidities and lime requirements of the 42 reference soils used in the lime incubation study will be determined using the new LA buffer. These values will be compared to those determined using the Yuan buffer as well as to those determined using the lime incubation method. If a suitable buffer method that is rapid and reliable can be developed, it can replace the slower lime incubation method. The buffer methods have the advantage of providing an estimate of soil acidity which can be added to the sum of the exchangeable cations to give a measure of the soil CEC at a particular pH. The Soil Test Lab determines soil texture but not CEC. By having estimates of soil acidity from a buffer method, soil CEC values can be reported in place of texture.

An experiment station bulletin summarizing the results of the lime incubation studies with all the reference soils is planned. This should provide a valuable reference in the future. Since these reference soils were also included in the soil characterization program, determinations of soil acidity and CEC by other methods are available for comparison with the lime incubation and buffer methods.

Native Soil Profile Fertility Levels

This is a separate project under the direction of Dr. Bob J. Miller. A detailed report of 1985 activities appears elsewhere in the Agronomy Department report. The objective of the project is to assess the native soil fetility levels of soil profiles in Louisiana. During 1985 reports of the native soil profile fertility levels of East Carroll, Calcasieu, St. Tammany, and Tangipahoa Parishes were prepared. These reports will be a valuable aid to farmers and agricultural scientists in assessing the native fertility status of the entire profile of key soils in a given area. Thus far in the project we have identified four major types of soil nutrient distributions in the soil profile. These are:

1) Soil profiles where the level of nutrients is relatively high throughout the soil profile

2) Soil profiles where the level of nutrients is relatively high in the surface layer but low in the subsoil

3) Soil profiles where the level of nutrients is relatively low in the surface layer but high in the subsoil

4) Soil profiles where the level of nutrients is relatively low throughout the soil profile

Type I soil profiles will not likely demonstrate a crop response to fertilizer. Type II profiles contain a relatively high level of nutrients in the surface layer because of fertilizer applications. Crops grown on type III soil profiles require a fertilizer source of nutrients early in the growing season until the roots are able to penetrate and exploit the fertile subsoil. Type IV profiles are the ones most likely to demonstrate a crop response to fertilizer. Some of these distribution patterns may also apply to non-nutrient elements such as aluminum and sodium and to other soil properties such as pH, acidity, organic matter, and CEC.

References

Yuan, T. L. 1974. A double buffer method for the determination of lime requirement of acid soils. Soil Sci. Soc. Am. Proc. 38: 437-440.

Table 1. 1985 Soil Test Lab Workload

Total number of soil samples: 25,000

Number of research soil samples: 5100

Number of irrigation water samples: 81

Routine soil tests: P, K, Ca, Mg, pH, lime requirement, organic matter, texture

Note: The routine soil tests are run on all soil samples. Lime requirement is determined only on soils with a pH of less than 6.1 and only on soils on which crops will be grown that will respond to lime applications. Sodium is also determined on many of the samples submitted. Irrigation water samples are analyzed for pH, salts, Na, Ca, and Mg.

Optional soil tests:

Boron:	237
Sulfur:	346
Mn, Fe, Cu, Zn:	1069
Salts:	717
Aluminum:	108
Arsenic:	33
Oil:	35
Total:	2545

Note: The optional soil tests are run at the request of clients submitting samples.

Table 2. Methods Used by the Soil Test Lab

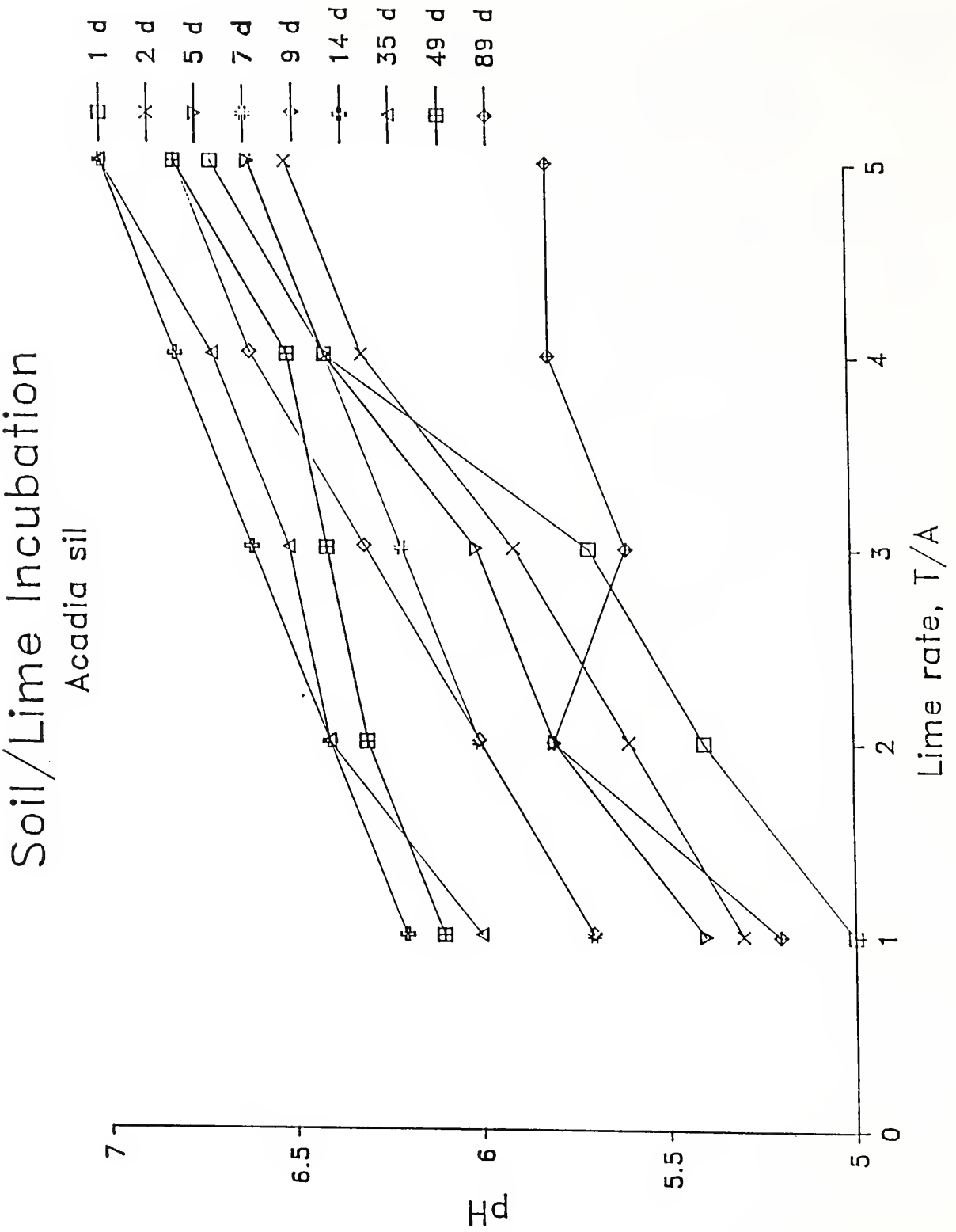
Soil Test	Extractant	Analysis
Phosphorus	0.03 M NH_4F + 0.1 M HCl	Autoanalyzer
Sodium	pH 7, 1 M NH_4OAc	Atomic absorption spectrophotometry (AAS)
Potassium	"	"
Magnesium	"	"
Calcium	"	"
pH	1:1 soil/water suspension	pH electrode + meter
Lime requirement	Titration with $Ca(OH)_2$ equivalent to 1, 2, 3 T/A lime	"
Organic matter	acid-dichromate oxidation	Colorimetric
Texture	Hand	
Soluble salts	1:2.5 soil/water suspension	Conductivity
Boron	Hot water	Inductively coupled plasma emission spectrometry (ICP)
Sulfur	0.5 M NH_4OAc + 0.25 M HOAc	"
Manganese	pH 7.3, 0.005 M DTPA	"
Iron	"	"
Copper	"	"
Zinc	"	"
	0.1 M HCl	"
Aluminum	0.1 M KCl	AAS
Arsenic	0.1 M HCl	ICP
Oil	petroleum ether	Gravimetric

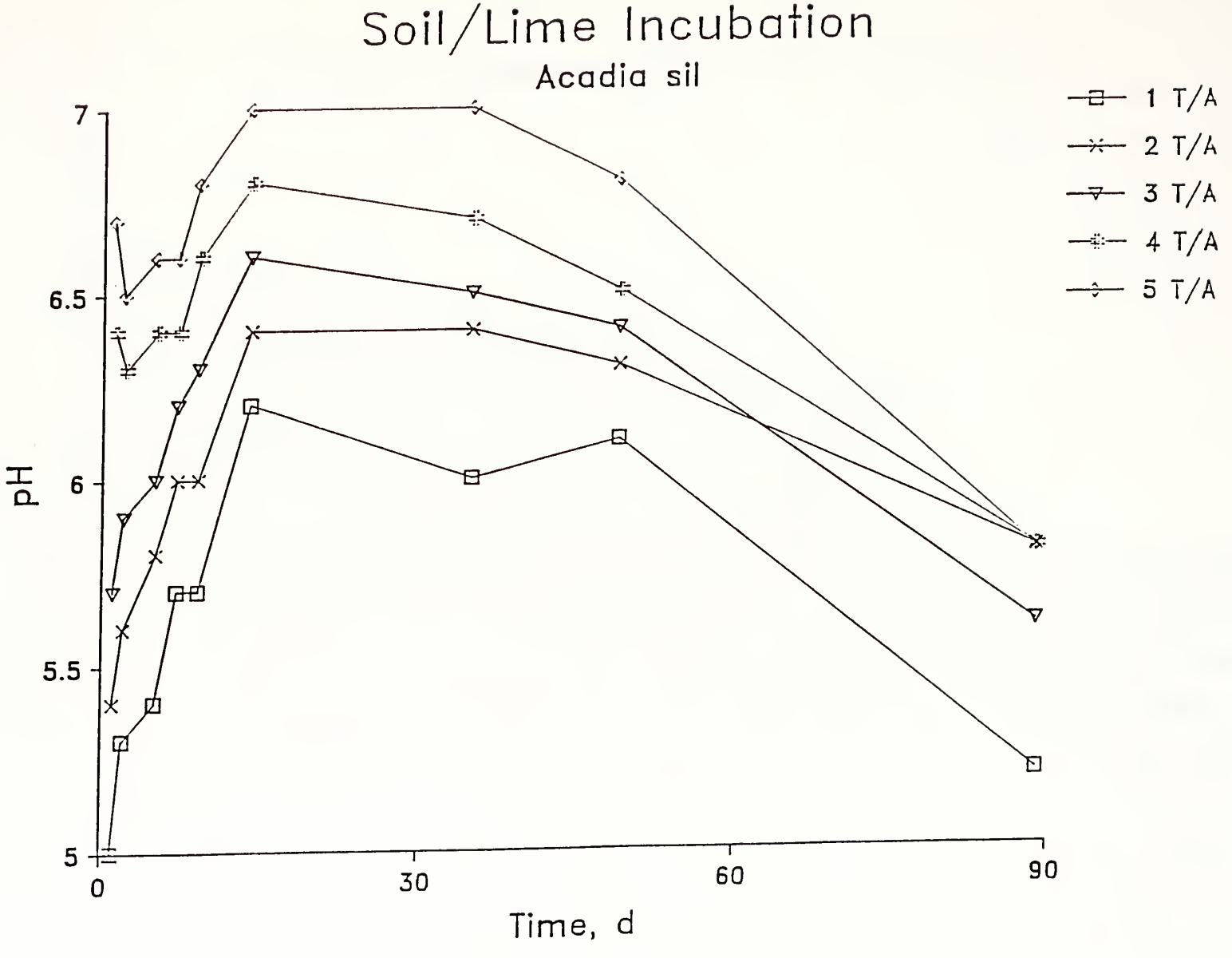
Table 3. Slopes and intercepts of regression equations describing relationship between acidity neutralized and pH for Florida (FL) and Louisiana (LA) buffers

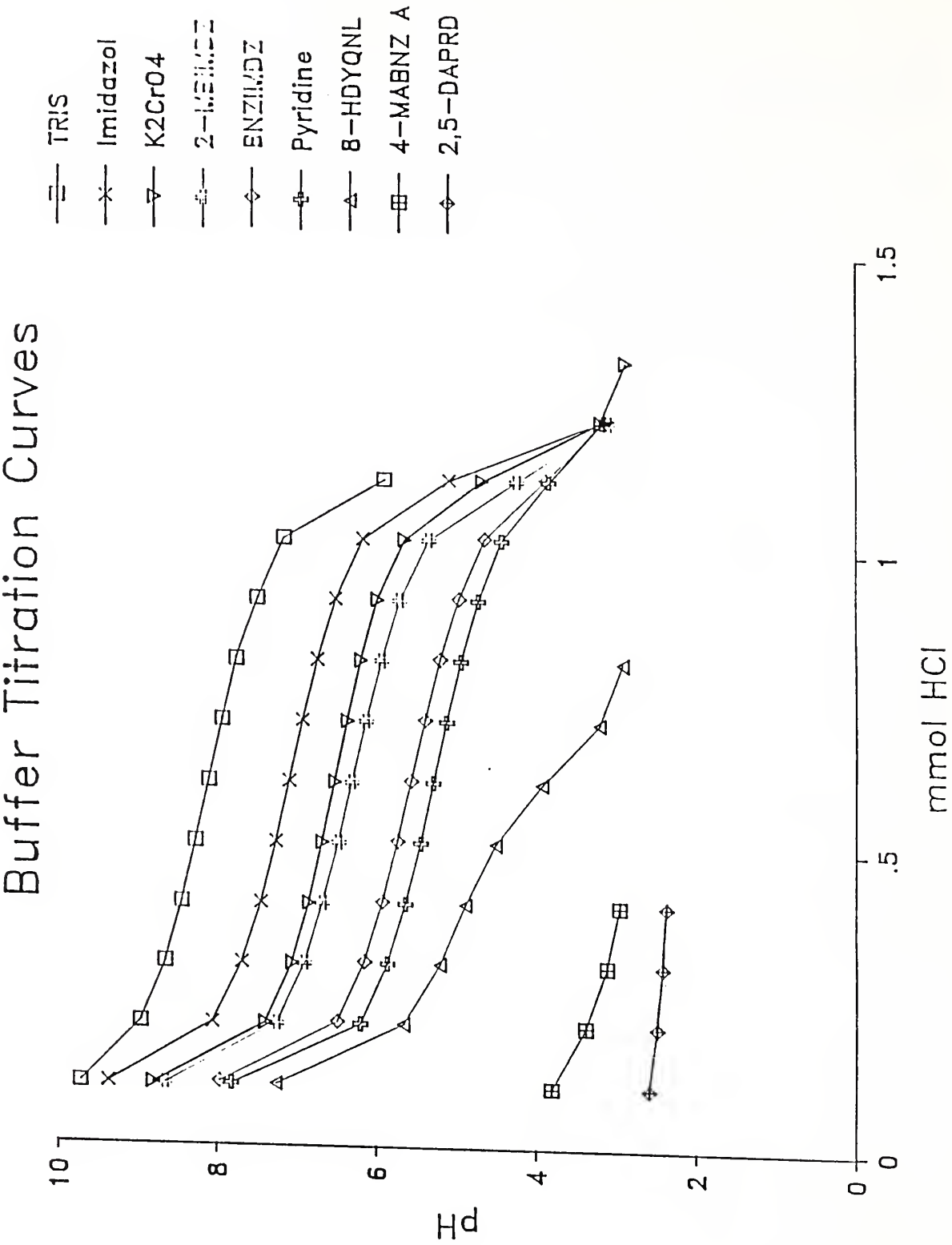
Regression equation: mmol acid = a + b x buffer pH

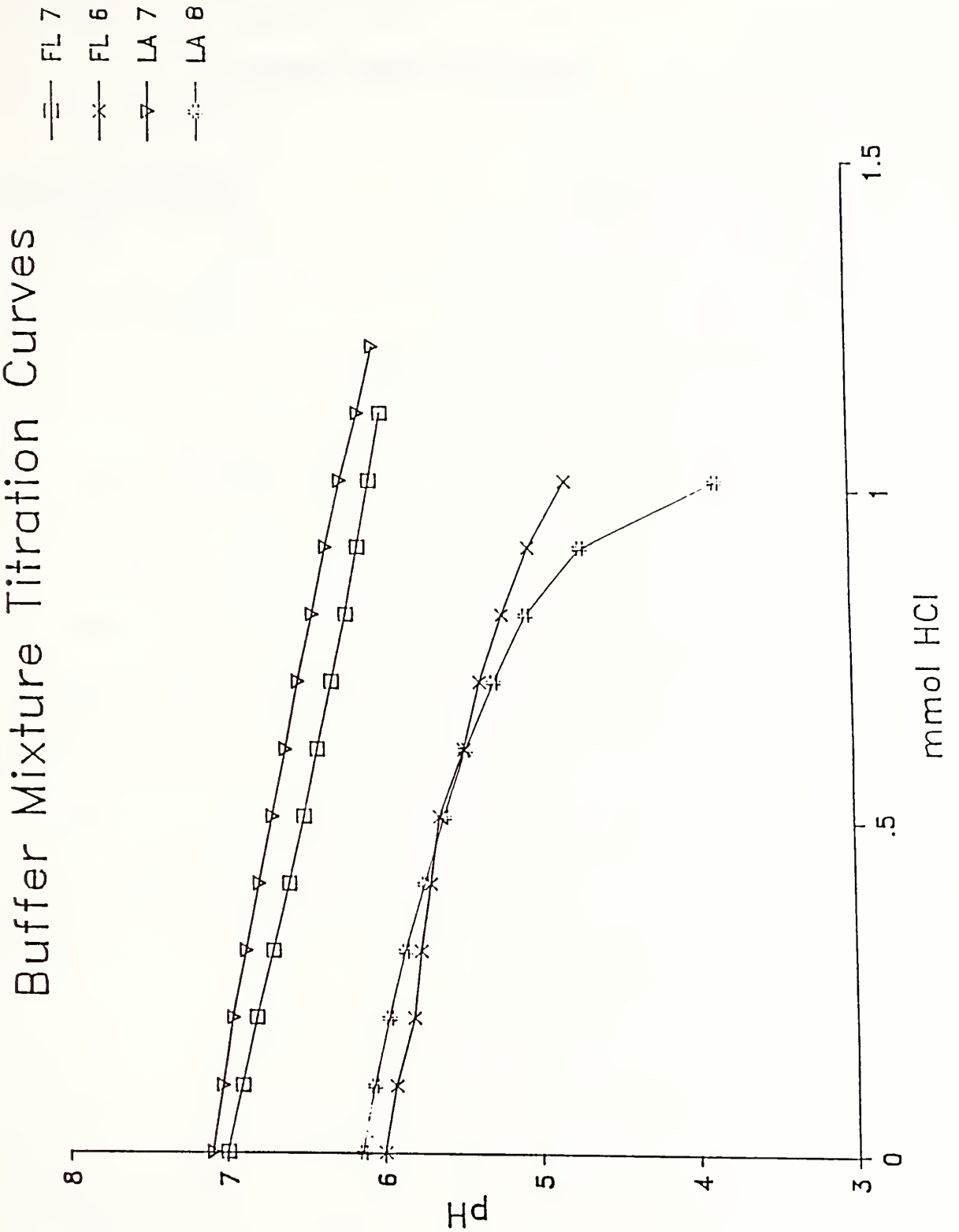
Buffer	Slope (b)	Intercept (a)	r^2
FL 7	1.0456	7.3027	0.998
FL 6	0.8610	5.2503	0.959
LA 7	1.0838	7.7311	0.997
LA 6	0.7418	4.6578	0.980

Note: Numbers in buffer name refer to initial nominal pH of buffers.


Soil/Lime Incubation
Acadia sil
1 d
2 d
5 d
7 d
9 d
14 d
35 d
49 d
89 d
pH
7
6.5
6
5.5
5
0
1
2
3
4
5
Lime rate, T/A


Soil/Lime Incubation
Acadia sil
1 T/A
2 T/A
3 T/A
4 T/A
5 T/A
pH
7
6.5
6
5.5
5
0
30
60
90
Time, d


Buffer Titration Curves
TRIS
Imidazol
K2Cr04
2-[illegible]
ENZIMDZ
Pyridine
8-HDYQNL
4-MABNZ A
2,5-DAPRD
pH
10
8
6
4
2
0
0
.5
1
1.5
mmol HCl


Buffer Mixture Titration Curves
FL 7
FL 6
LA 7
LA 8
pH
8
7
6
5
4
3
0
.5
1
1.5
mmol HCl

FILE: _____

RESEARCH SOIL SAMPLE INFORMATION

DATE SAMPLED: |_|_|_/|_|_|/|_|_| (1-8) DATE RECEIVED: _____ (10-17)

DATE COMPLETED: _____ (19-26)

NAME: |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_| (1-25)

ADDRESS: |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|
Department or Station (1-25)

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|
Address (1-25)

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_| |_|_| |_|_|_|_|_|
City (1-16) State (18-19) Zip Code (21-25)

PROJECT NAME OR NUMBER: |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_| (1-25)

LOCATION: |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_| (1-25)

LAB NUMBER (1-6)	SAMPLE IDENTIFICATION (8-27)	DEPTH (29-36)
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
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_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
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_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____
_____	|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|	_____

Soil Sample Information

SOIL TESTING LABORATORY
DEPARTMENT OF AGRONOMY
LOUISIANA STATE UNIVERSITY
BATON ROUGE, LA 70803

LOUISIANA COOPERATIVE
EXTENSION SERVICE
LOUISIANA STATE UNIVERSITY
AGRICULTURAL CENTER

SAMPLING DATE: |_|_|/|_|_|/|_|_|

FARMER NAME AND ADDRESS:

Last First Mid Int

Address

City State Zip Code

County Agent Signature and Title

PARISH: _____
Name

SOIL INFORMATION:

Lab number	Field ident.	Soil series	Soil info codes [A]	[B]	[C]	[D]

CROP TO BE GROWN:

Crop name	Yield goal	Will crop be irrigated? Yes	No	Will manure be applied? Yes	No	Cover crop

LAST CROP:

Crop name	Yield	Last fertilizer application N	P205	K20 (lbs/acre)	Months since lime last applied	Last liming rate T/A

SPECIAL TESTS NEEDED: _____

SOIL INFORMATION CODE LIST

SOIL AREA CODE - GEOGRAPHIC SETTING OF SOIL

CODE	GEOGRAPHIC SETTING OF SOIL
1	COASTAL PLAINS
2	FLATWOODS
3	COASTAL PRAIRIES
4	LOESSIAL HILLS AND MISSISSIPPI TERRACES
5	ALLUVIAL TERRACE AND ALLUVIAL SOILS
6	GARDENS

SLOPE CODES

CODE	SLOPE
1	LEVEL
2	SLIGHT
3	MODERATE
4	STEEP

SUBSOIL DRAINAGE CODES

CODE	SUBSOIL DRAINAGE
1	EXCESSIVE
2	GOOD
3	FAIR
4	POOR

SAMPLING DEPTH CODES

CODE	SAMPLING DEPTH
1	0 - 2 INCHES
2	0 - 6 INCHES
3	GREATER THAN 6 INCHES

INSTRUCTIONS

SOIL SAMPLING

1) Divide fields into areas to be sampled on the basis of soil type, slope, and crop to be grown.
2) Take samples to a depth of 2-4 inches for pasture and 5-7 inches for row crops.
3) Take sub-samples from at least ten places in each area to be sampled and combine the sub-samples to obtain a composite sample for each sampling area.
4) Mix the composite sample thoroughly.
5) Fill a one pint soil sample box with soil from the mixed composite sample.
6) Fill out the information sheet as completely as possible and take the soil sample and information sheet to your County Agent's office to be sent to the laboratory.

SOIL SAMPLE INFORMATION SHEET

General Instructions: Please fill out the form as completely as possible. The more information you provide, the more accurate the recommendation is likely to be. Also, this information will greatly assist us in evaluating our soil test methods and recommendations. Some of the information requested is to be printed into the boxes shown on the information sheet. Please print only one letter or number per box. The various soil info codes needed may be found on the attached soil info code list. You may use one information sheet for up to four soil samples.

Special Instructions for Home Garden Samples: Please provide only the following information: Sampling date, Grower name and address, Parish, Field(sample) identification, and the name of the crop to be grown. The other information is not needed for home lawn and garden samples.

Additional Instructions

Soil Information

Lab Number: Leave blank. The Soil Testing Laboratory assigns a number to each sample to track the samples through the laboratory.

Field Identification: Print a field or sample identification for each sample in the space provided. The field identification may consist of up to eight(8) letters or numbers and should be used by the farmer to identify his or her samples.

Soil Series Name: If known, print the name of the soil series where each soil sample was taken in the space provided. The soil series information will greatly assist us in providing a more accurate recommendation and will help us in evaluating our soil testing program.

Soil Info Codes: Each column will provide additional information about the soil sampled. The codes are found on the attached soil info code list.

Column [A]: Soil area code - Print the code number of the soil area where the soil samples were taken in the space provided.

Column [B]: Slope code - Print the code number of the slope of the sampled area in the space provided.

Column [C]: Subsoil drainage code - Print the code number of the subsoil drainage of the area sampled in the space provided.

Column [D]: Depth code - Print the code number of the sampling depth in the space provided.

Crop To Be Grown

Crop Name: Print the name of the crop to be grown in the space provided.

Yield Goal: Print the yield goal in bushels per acre, pounds per acre, or tons per acre depending on the crop to be grown in the space provided.

Cover Crop: If a cover crop has been grown on the area sampled, print the name of the crop in the space provided.

Last Crop

Crop Name: Print the name of the last crop grown in the sampled area in the spaces provided.

Yield: Print the yield in bushels per acre, pounds per acre, or tons per acre of the last crop grown in the sampled area in the space provided.

Last Fertilizer Application: Print the amounts of fertilizer in lbs per acre that were last applied to the sampled area in the spaces provided.

Months Since Lime Last Applied: Print the number of months since lime was last applied to the sampled area in the space provided. If more than eighteen months or never leave blank.

Last Liming Rate: Print the amount of lime in tons per acre that was last applied to the sampled area in the space provided.

File: _____

IRRIGATION WATER INFORMATION FORM

SOIL TESTING LABORATORY
DEPARTMENT OF AGRONOMY
LOUISIANA STATE UNIVERSITY
BATON ROUGE, LA 70803

LOUISIANA COOPERATIVE
EXTENSION SERVICE
LOUISIANA STATE UNIVERSITY
AGRICULTURAL CENTER

DATE SAMPLED: |_|_|/|_|_|/|_|_| (1-8)

DATE RECEIVED: _____ (10-17)

DATE COMPLETED: _____ (19-26)

NAME AND ADDRESS:

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|
Last (1-25) First Mid Int

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|
Address (1-25)

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_| |_|_| |_|_|_|_|
City (1-16) State (18-19) Zip Code (21-25)

PARISH: _____ (1-3)

Sample Identification	pH	Conductivity -µmhos-	Sodium	Magnesium	Calcium
			ug/mL		
|_|_|_|_|_|_|_|_|_|_|	_____	_____	_____	_____	_____
|_|_|_|_|_|_|_|_|_|_|	_____	_____	_____	_____	_____
|_|_|_|_|_|_|_|_|_|_|	_____	_____	_____	_____	_____
|_|_|_|_|_|_|_|_|_|_|	_____	_____	_____	_____	_____
(1-10)	(12-14)	(16-21)	(23-28)	(30-34)	(36-40)

INSTRUCTIONS:

1) Run water through the lines for at least five minutes before taking a sample. Use a clean bottle for the sample.

2) Print the sampling date and your name, address, Parish, and sample identification in the spaces provided. Leave the other spaces blank. These spaces are for use by the laboratory.

3) Send or bring the sample to the Soil Testing Laboratory. The lab will measure pH, conductivity, sodium, and if necessary, magnesium and calcium in your sample and send you a report on the suitability of the water for irrigation.

IRRIGATION WATER ANALYSIS RESULTS, INTERPRETATIONS, AND RECOMMENDATIONS

LOUISIANA COOPERATIVE EXTENSION SERVICE
LOUISIANA STATE UNIVERSITY AGRICULTURAL CENTER
KNAPP HALL
BATON ROUGE, LA 70803-1900
504-388-4141

SOIL TESTING LABORATORY
DEPARTMENT OF AGRONOMY

DATE SAMPLED: 06/13/85
DATE RECEIVED: 06/13/85
DATE COMPLETED: 06/13/85
OUTPUT FILE: IRWTRT.DAT

ANYONE
ANYWHERE
BATON ROUGE LA 70803

DEAR FARMER:

WE ARE PLEASED TO SUPPLY YOU WITH THE ANALYSIS RESULTS, INTERPRETATIONS, AND RECOMMENDATIONS FOR YOUR IRRIGATION WATER SAMPLES.

OLEN D. CURTIS, SPECIALIST

PARISH: EAST BATON ROUGE

		INTERPRETATION ------LOW----------MEDIUM----------HIGH-----
SAMPLE IDENT:	LOW SALT	
PH:	5.6	**********
CONDUCTIVITY:	200. UMHOS	**********
SOLUBLE SALTS:	128. MG/L	*
SODIUM:	60.0MG/L	***
MAGNESIUM:	3.0MG/L	*********
CALCIUM:	15.0MG/L	*********
SAR:	3.7	**********
SAMPLE IDENT:	MED SALT	
PH:	6.5	**********
CONDUCTIVITY:	500. UMHOS	**********
SOLUBLE SALTS:	320. MG/L	*******
SODIUM:	150.0MG/L	**********
MAGNESIUM:	20.0MG/L	**********
CALCIUM:	50.0MG/L	**********
SAR:	4.5	**********
SAMPLE IDENT:	HIGH SALT	
PH:	7.5	**********
CONDUCTIVITY:	1500. UMHOS	**********
SOLUBLE SALTS:	960. MG/L	**********
SODIUM:	300.0MG/L	**********
MAGNESIUM:	35.0MG/L	**********
CALCIUM:	100.0MG/L	**********
SAR:	6.6	**********

SAR = SODIUM ADSORPTION RATIO

Cultural Practices and Soil Fertility for Sugarcane

Ray Ricaud and Allen Arceneaux
Agronomy Department

Research was continued in 1985 to determine the effects of cultural practices and fertilization on the yield of current varieties of sugarcane in Louisiana. Cultural practice experiments were conducted on methods and rates of planting, date of planting, date of harvest, cane stubble protection and stubble cane longevity. Soil fertility experiments were conducted on fertilizers and nematocide needs for succession cane, rates and methods of fertilizer application, rates of fertilizers and bagasse and rates of gypsum application. These experiments were conducted in cooperation with the St. Gabriel Research Station and growers in the cane area.

The research was designed to provide information in an effort to help cane growers to produce maximum economic yields and to increase profitability in sugarcane production. This annual progress report is presented to provide the latest available data on certain practices and not as a final recommendation for growers to use all of these practices. Recommendations are based on several years of research data.

The weather conditions during the growing season for sugarcane were close to normal in 1985. However, a hurricane with high winds caused severe damage to the cane crop at the beginning of the harvest season. The yields were not reduced by the hurricane, but the accuracy in measuring yield of damaged cane was reduced on some of the plots.

Methods of Planting

One experiment was conducted with plant cane to determine the effects of widths of planting furrow and rates of planting on the yield of cane varieties CP 65-357 and CP 72-370. The furrow widths were 15 and 24 inches and the rates of planting were 2 and 4 stalks in continuous lines on a standard row spacing. A V-furrow was planted with each variety as a check plot. The yield data obtained in this test are reported in Table 1. The increases in cane and sugar yields from the wide furrow planting approached significance with CP 65-357 and were significant with CP 72-370 using the 24-inch furrow and a four-stalk rate of planting. The increase in yield from the four over the two-stalk rate approached significance with CP 72-370 planted 24 inches wide.

An experiment was continued in 1985 from a plant cane test in 1984 to determine the effects of width of planting furrow on the first stubble yield. The furrow widths were 18, 24 and 36 inches on a standard row spacing and the varieties tested were CP 72-370 and CP 74-383. The data reported in Table 2 show that the increases in cane and sugar yields from the 18-, 24- and 36-inch furrow over the check plot were significant with CP 72-370 but not with CP 74-383. As an average of varieties, the increases in yield from each furrow

1/This research was supported in part by grant funds from the American Sugarcane League, Potash and Phosphate Institute, U.S. Gypsum Co. and by sugarcane growers.

width over the V-furrow check plot were also significant. The increases in yield were due principally to the increases in stalk population. The differences in yield among the 18-, 24- and 36-inch furrows were small in this first stubble test.

Another experiment was continued from a plant cane test in 1983 and a first stubble test in 1984 to determine the effects of width of planting furrow on the second stubble yield in 1985. The furrow widths were 18, 24 and 36 inches and the varieties were CP 72-370 and CP 74-383. The second stubble data reported in Table 3 show that the increases in cane and sugar yields from the wide furrow planting approached significance, especially from the 36-inch furrow with each variety. As an average of varieties, the 36-inch furrow produced significantly more second stubble cane yield than the V-furrow.

Date of Planting

An experiment was initiated to determine the effects of planting dates on the plant cane yield of four current varieties of sugarcane. The dates tested were September 13, October 8 and November 11 and the varieties were CP 65-357, CP 70-321, CP 72-370 and CP 74-383. The varieties were planted on each date in 1984 and harvested as plant cane in December, 1985. The data obtained are reported in Table 4. Each variety, except CP 74-383 produced more cane when planted in September than in November. CP 74-383 produced more cane when planted in October than in September. This indicates that this variety should be planted later than the other varieties tested.

Another test was continued from plant cane in 1984 to determine the effects of planting dates on the first stubble yield of four varieties. The dates were August 25, September 28 and October 27 and the varieties were CP 65-357, CP 70-321, CP 72-370 and CP 74-383. The varieties were planted in 1983 and harvested as plant cane in November, 1984 and as first stubble in October, 1985. The yield data obtained with first stubble are reported in Table 5. The cane and sugar yields were lower from the August planting than the later dates, especially with CP 70-321 and CP 72-370. The yields were lower from the October planting than the earlier dates with CP 74-383. This is contrary to the results obtained with plant cane in this test in 1984, in that the September planting produced more yield than other dates with each variety.

Succession Cane

One experiment was conducted with succession planted sugarcane to determine the effects of applying fertilizers and furadan nematocide in the fall and spring on the yield of plant cane. The test was conducted with cane variety CP 70-321 on a Commerce silt loam soil located on the St. Gabriel Research Station in 1985. The treatments consisted of a fall application of 0-0-0 and 90-90-90 fertilizer, a spring application of 120-0-80 and 240-0-160 fertilizers and a fall and spring application of 10 lbs/A of furadan in all combinations. The fall applications were made at planting time in 1984 and the spring applications were made in April, 1985.

The data obtained are reported in Table 6. The increases in cane and sugar yields from the application of the fall fertilizer were significant with each rate of the spring applied fertilizer where furadan was not applied, but

not significant where furadan was applied to plant cane. The differences in yields between the 120-0-80 and 240-0-160 treatments applied in spring were small. The increases in yields from the use of furadan were significant only without the fall fertilizer treatment. Apparently, the nematocide influenced the yield response of plant cane planted in succession with another cane crop.

The differences in stalk number and weight and in the normal juice brix and sucrose due to treatments were not significant. The soil analysis data indicated that the extractable soil K and organic matter were relatively low and the yield response to fall applied fertilizer was apparently due to the N and K fertilizers.

A test to compare the needs of fall and spring applications of fertilizers for fallow and succession planted sugarcane was continued on a Commerce silt loam soil on the St. Gabriel Station. The test was initiated with CP 74-383 variety of plant cane in 1984 and continued as first stubble cane in 1985. The fertilizer treatments were a fall application of 0-0-0 and 90-90-90 at planting time in 1983 and a spring application of 120-0-80 and 240-0-160 in April of 1984 and 1985 on fallow and succession planted cane.

The data obtained in this experiment are reported in Table 7. The differences in yield of first stubble cane from the application of fall fertilizer were significant only with the spring applied 240-0-160 fertilizer with fallow planted cane. The differences in yield between the two rates of spring fertilizer treatments were not significant. The yield components and sugar yields were not affected by the fertilizer treatments. The soil analysis data indicated that the extractable soil K was relatively low and higher yield responses to applied K were expected.

As average of fertilizer treatments, the differences between succession and fallow planted cane in the yield of first stubble cane were not significant. In plant cane last year, the yields were lower and the responses to fertilizer were higher with succession than fallow planted cane. This may indicate that the expected adverse effects of planting cane in succession with another crop are more pronounced in the plant cane year.

A test to compare the fertilizer needs of two varieties of sugarcane planted after a normal fallow year and planted in succession immediately after harvesting a cane crop was continued on Commerce silt loam soil at the St. Gabriel Research Station. The test was initiated with varieties CP 65-357 and CP 70-370 as plant cane in 1983 and continued as first stubble in 1984 and second stubble in 1985. The fertilizer treatments were 120-0-80, 240-0-160 and 360-0-240 applied to fallow and succession planted cane of each variety in the spring of each crop year.

The results obtained with second stubble cane are reported in Table 8. The increases in cane and sugar yields and yield components of second stubble cane from the fertilizer treatments with succession and fallow planted cane of each cane variety were not significant. As an average of fertilizer treatments, the differences in yield of the succession and fallow planted cane of each cane variety were not significant. As an average of fertilizer treatments, the differences in yield of the succession and fallow cane were also not significant. Variety CP 72-370 produced more cane than CP 65-357.

The soil analysis indicated that the extractable soil K was relatively low and a higher response to applied K was expected, especially with second stubble from succession planted cane.

Rate and Method of Fertilizer Application

An experiment was initiated in 1985 to test rates and methods of fertilizer application on the yield of plant cane with variety CP 65-357. The extractable soil P was relatively high at this location and the fertilizer treatments consisted of 80 and 160 pounds of nitrogen and 0, 80 and 160 pounds of potash per acre. Two methods of application were tested consisting of banding the fertilizer in the off-bar furrow and broadcasting the fertilizer on the soil surface. All the treatments were applied in April, 1985. The data obtained are reported in Table 9. The treatments which produced significantly more cane yield than the 0-0-0 check plot were 80-0-80 banded, 160-0-80 banded, and 160-0-160 banded and broadcasted. The results indicated that the band method of application should be used with the lower rates of fertilizer.

Fertilization of High Population Cane

A fertilizer test was continued with first stubble cane in 1985 from plant cane in 1984. The test was planted with variety C 72-370 using the wide furrow method of planting on a Commerce soil at the St. Gabriel Station. The extractable soil P was relatively high and the fertilizer treatments consisted of 120 and 240 pounds of nitrogen and 0, 60, 120 and 180 pounds of potash per acre. The treatments were applied in the off-bar furrow in April, 1985. The data obtained are reported in Table 10. The cane yields produced with 120 pounds of nitrogen alone and with all the N x K combination treatments were significantly higher than that of the check plot. Generally, the yield responses to applied potash were positive and approached significance with the 120 rate of nitrogen.

Bagasse and Fertilizer Application

An experiment was continued to test the effects of cane bagasse and fertilizer rates on the yield of sugarcane on Commerce silt loam soil on Cinclare Plantation in Port Allen, La. Bagasse at the rates of 0, 30 and 60 tons of dry matter per acre was broadcasted and disked into the soil during the fallow year prior to planting cane variety CP 70-321 in 1982. The test was initiated with different fertilizer rates at each bagasse rate with plant cane in 1983 and continued with first stubble cane in 1984 and second stubble in 1985. The fertilizer rates consisted of 0-0-0 and 160-0-90 with each bagasse rate and 320-0-180 with the 30 and 60 T/A bagasse rates. Anhydrous ammonia and liquid potash were used as the sources of fertilizers. The data obtained are reported in Table 11. The yield increase with second stubble from the 60 T/A rate of bagasse without applied fertilizer was significant. The applied fertilizers did not increase yield with the 60 T/A rate of bagasse. The increases in yield from the 160-0-80 fertilizer without bagasse and from 160-0-80 and 320-0-180 fertilizers with the 30 T/A rate of bagasse were significant. This indicates that the high rate of bagasse is reducing the need for applied fertilizers in second stubble.

Gypsum Test

A test was initiated with plant cane in 1985 to determine the effects of applied mined gypsum on soil properties and cane yield on a Sharkey clay soil at Judice Farms in New Iberia. The rates of gypsum tested were 0, 1, 2.5, 5 and 10 tons per acre with four replications of each rate. The treatments were broadcasted by hand and mixed into the topsoil with the use of a rototiller prior to planting variety CP 65-357 in the fall of 1984. Normal cultural practices were followed during the growing season.

The yield data obtained with plant cane in this test are reported in Table 12. The yield increases from the gypsum treatments were positive and approached significance with the 10 T/A rate. The increase in stalk number from the 10 T/A rate was significant. The increases in the other yield components and in sugar yield did not reach significance. It is expected that the yield responses will be more pronounced in the stubble crops. The effect of gypsum on soil properties is the subject of a M.S. thesis and will be published at a later date.

Date of Harvest

Experiments on date of harvesting current sugarcane varieties were conducted on the St. Gabriel Research Station. One test was initiated in 1984 to determine the effects of harvesting plant cane on the yield of the following first stubble crop in 1985. Plant cane varieties CP 65-357, CP 70-321, CP 72-370 and CP 74-383 was harvested on September 1, October 1, November 1 and December 1 in 1984. The first stubble was harvested in November, 1985 and the yield data are reported in Table 13. The effects of date of harvesting plant cane on the yield of the following stubble yield were similar with each variety. Generally, the yields increased progressively from the September harvest to the December harvest date. As an average of varieties, the yield increases were significant from the November over the September date and from the December over the November harvest date. These results show that plant cane must be harvested late in the harvest season to produce the highest yield of first stubble during the following year.

Another test was initiated to determine the effects of date of harvesting plant cane on the yield of plant cane in 1985 and first stubble cane in 1986. Plant cane of varieties CP 65-357, CP 70-321, CP 72-370 and CP 74-383 was harvested on September 12, October 7, November 11 and December 9 in 1985. The data obtained for the last three harvest dates are reported in Table 14. The increases in cane yield during the harvesting season were positive with each variety and significant during October with CP 65-357, CP 72-370 and CP 74-383. As an average of varieties, the increases were significant in cane yield during October and November and in stalk weight, sucrose and sugar yield during October.

Stubble Protection

Experiments were conducted on stubble protection from freeze damage to possibly increase the yield and longevity of stubble cane. The protection treatments consisted of covering the cane stubble with approximately three inches of soil after harvesting a crop and a check plot without covering. The

soil cover was applied in November prior to the occurrence of a freeze and the cover was removed in the spring with a stubble shaver.

In one test, plant cane of varieties CP 65-357 and CP 72-370 was harvested on September 1, October 1 and November 1 in 1984. The soil cover treatment was applied in November to the cane stubble of each variety from each harvest date. The data with first stubble in 1985 are reported in Table 15. The increases in cane yield from the stubble protection treatment were significant with each harvest date of each variety. As an average of varieties, the increases were 5.1 T/A or 19.1% in cane yield, 3,100 or 12.8% in stalk number and 1,151 lbs/A or 21.9% in sugar yield.

In another test, varieties CP 65-357 and CP 72-370 was planted in furrow widths of V, 18, 24 and 36 inches wide in 1980 and the plant and first stubble cane crops were harvested to determine the effects of furrow widths on yield. Soil covering treatment was applied to the cane stubble after the first stubble harvest in 1982 and after the second stubble harvest in 1983 and after the third stubble in 1984. The average yield of the two varieties in the fourth stubble crop in 1985 are reported in Table 16. The increases in cane yield from stubble protection were positive with each furrow width and were significant with the 24- and 36- inch furrow widths. As an average of furrow widths, the protection treatment significantly increased cane yield 4.3 T/A, stalk number 6,000 per acre and sugar yield 755 pounds/A. These results with fourth stubble cane show that stubble longevity can be increased by covering the cane stubble with soil during the winter months.

Stubble Cane Longevity

An experiment was initiated in 1983 with plant cane and continued through second stubble in 1985 to study the yielding ability of current varieties in stubble crops. Varieties CP 65-357, CP 70-321, CP 70-330, CP 72-356, CP 72-370, and CP 74-383 were compared in the study and the results are presented in Table 17. The results show that yield decline in stubble crops vary among cane varieties. The decline was similar for varieties CP 65-357, CP 70-321 and CP 70-330. A drastic reduction in yield occurred with second stubble of CP 72-356, whereas the second stubble yield of CP 74-383 was relatively high and similar to the first stubble yield. Proper selection of varieties for planting is important to produce acceptable yields of stubble crops.

Another test on stubble longevity was initiated with plant cane in 1985 to study the effects of cane varieties, Furadan nematocide and stubble protection on stubble crop yields. The varieties were CP 70-321, CP 72-370 and CP 74-383 and the Furadan rates used were 0 and 10 pounds per acre. The Furadan was applied at planting time in 1984 and in the off-bar furrow in April, 1985. The stubble protection which consisted of covering the cane stubble after harvesting the plant cane crop was applied in December, 1985. Since the protection treatment did not affect the plant cane, only the data for varieties and Furadan are reported for plant cane this year in Table 18. The yield increases from the Furadan treatment were positive for each variety and significant with CP 72-383. As an average of varieties, significant increases from the Furadan treatment occurred in cane yield, stalk number and sugar yield. This test will be continued with several stubble crops to determine the possible need of a nematocide and stubble protection to increase the yield and longevity of stubble crops with current varieties of sugarcane.

Table 1. Effect of planting furrow width and rate of planting on plant cane yield of two varieties of sugarcane on a Commerce soil at the St. Gabriel Station, 1985.

Variety of cane	Drill width	Rate of planting	Plant cane yield	Stalk		Normal juice		Sugar yield
				No.	Wt.	Brix	Sucrose	
	in.	stalks	T/A	1000/A	lbs.	%	%	lbs/A
CP 65-357	V	2	42.6	31.4	2.86	17.3	14.3	8700
	15	2	43.3	33.6	2.81	17.5	14.4	8953
	15	4	45.1	34.8	2.97	17.4	14.3	9248
	24	2	46.4	33.9	2.90	17.3	14.1	9369
	24	4	45.0	34.9	2.92	17.0	14.0	8973
CP 72-370	V	2	40.8	25.6	3.29	15.8	12.9	7353
	15	2	43.2	27.9	2.96	16.0	13.0	7909
	15	4	42.1	29.0	3.02	16.0	12.9	7636
	24	2	41.9	26.1	3.07	15.8	12.9	7580
	24	4	45.5	30.4	3.19	16.1	13.2	8449
HSD .05			4.6	8.3	NS	1.3	1.1	1162

Rate of planting was the number of stalks planted in continuous lines with a 10% overlap.

Table 2. Effect of planting furrow width on the first stubble cane yield of two varieties of sugarcane on Commerce soil on the St. Gabriel Station, 1985.

Variety of cane	Drill width	Stubble cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
	in.	T/A	1000/A	lbs.	%	%	lbs./A
CP 72-370	V	24.5	22.1	2.55	16.6	14.0	4888
	18	32.2	25.1	2.57	16.2	13.3	6054
	24	33.7	25.4	2.55	16.2	13.3	6342
	36	33.3	27.0	2.45	16.5	13.7	6472
CP 74-383	V	45.6	34.0	2.85	15.5	12.5	7911
	18	47.6	39.8	2.77	15.2	12.2	7991
	24	46.4	37.0	2.73	15.5	12.6	8136
	36	46.0	38.6	2.72	15.4	12.5	8023
HSD .05		3.7	7.4	0.39	0.7	0.9	869
			Mean drill width effect				
	V	36.1	28.1	2.70	15.8	13.0	6475
	18	39.9	32.4	2.67	15.7	12.7	7023
	24	40.1	31.2	2.64	15.8	13.0	7239
	36	39.6	32.8	2.58	15.9	13.1	7247
HSD .05		2.1	4.3	NS	NS	NS	511

Table 3. Effect of planting furrow width on second stubble yield of two varieties of sugarcane on Commerce soil on the St. Gabriel Station, 1985.

Variety of cane	Drill width	Stubble cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
	in.	T/A	1000/A	lbs.	%	%	lbs./A
CP 72-370	V	24.9	25.0	2.07	16.1	13.5	4749
	18	24.1	24.1	1.91	16.1	13.5	4579
	24	24.9	21.6	2.02	16.2	13.4	4704
	36	27.7	22.8	1.98	15.9	13.1	5097
CP 74-383	V	37.6	32.5	2.22	15.5	12.5	6546
	18	40.5	33.2	2.38	15.7	12.7	7166
	24	39.4	31.7	2.25	15.5	12.5	6862
	36	40.6	32.2	2.23	15.9	13.0	7316
HSD .05		3.9	7.0	0.29	NS	NS	1015
			Mean drill width effect				
	V	31.3	28.7	2.14	15.8	13.0	5648
	18	32.3	28.7	2.15	15.9	13.1	5873
	24	32.1	26.7	2.13	15.8	13.0	5783
	36	34.0	27.5	2.10	15.9	13.0	6207
HSD .05		2.3	NS	NS	NS	NS	NS

Table 4. Effect of date of planting on the plant cane yield of four varieties of sugarcane on Commerce soil on the St. Gabriel Station, 1985.

Variety of cane	Date of planting	Plant cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
		T/A	1000/A	lbs.	%	%	lbs./A
CP 65-357	Sept. 13	46.0	32.4	2.57	17.6	14.1	9456
	Oct. 8	44.2	34.3	2.79	16.8	13.6	8541
	Nov. 11	41.3	31.8	2.62	17.2	14.2	8320
CP 70-321	Sept. 13	47.5	32.1	3.02	17.0	14.4	9771
	Oct. 8	46.0	32.4	3.12	17.1	14.5	9537
	Nov. 11	43.1	30.1	3.07	16.7	14.0	8623
CP 72-370	Sept. 13	44.1	30.0	2.97	16.1	13.2	8163
	Oct. 8	44.7	31.8	3.19	15.9	13.0	8184
	Nov. 11	40.0	29.9	3.22	15.9	13.1	7362
CP 74-383	Sept. 13	47.6	36.5	2.80	16.3	13.4	8963
	Oct. 8	53.6	36.4	3.01	16.3	13.5	10,229
	Nov. 11	51.3	39.0	2.93	16.2	13.4	9693
HSD .05		4.2	6.0	0.64	1.1	1.1	1166
			Mean date effect				
	Sept. 13	46.3	32.8	2.84	16.8	13.8	9088
	Oct. 8	47.1	33.7	3.03	16.5	13.7	9123
	Nov. 11	43.9	32.7	2.96	16.5	13.7	8500
HSD .05		1.5	NS	NS	NS	NS	403

Table 5. Effect of date of planting on the first stubble yield of four varieties of sugarcane on Commerce soil on the St. Gabriel Station, 1985.

Variety of cane	Date of planting	Stubble cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
		T/A	1000/A	lbs.	%	%	lbs./A
CP 65-357	Aug. 25	31.2	29.7	2.29	17.2	14.3	6396
	Sept. 28	32.4	26.0	2.55	17.6	14.6	6872
	Oct. 27	33.0	27.8	2.38	17.6	14.7	6974
CP 70-321	Aug. 25	31.7	29.5	2.81	16.7	14.1	6371
	Sept. 28	39.3	27.3	2.72	17.2	14.5	8197
	Oct. 27	36.3	29.2	2.52	17.1	14.5	7547
CP 72-370	Aug. 25	30.8	27.7	2.74	16.4	13.6	5935
	Sept. 28	37.5	26.1	3.02	16.2	13.2	6971
	Oct. 27	37.6	27.5	2.77	15.9	13.0	6885
CP 74-383	Aug. 25	46.4	34.5	2.56	16.7	13.9	9206
	Sept. 28	51.6	35.4	2.79	16.4	13.6	9973
	Oct. 27	43.1	31.9	2.90	16.7	13.8	8455
HSD .05		3.0	NS	0.52	1.1	1.0	1077
			Mean date effect				
	Aug. 25	35.0	30.3	2.60	16.8	14.0	6977
	Sept. 28	40.3	28.7	2.77	16.9	14.0	8003
	Oct. 27	37.5	29.1	2.64	16.8	14.0	7465
HSD .05		1.0	NS	NS	NS	NS	372

Table 6. Effect of fall and spring applications of fertilizers and Furadan nematocide on the yield and yield components of plant cane planted in succession without a fallow year on Commerce silt loam soil at the St. Gabriel Research Station, 1985.

Fertilizer N-P_2O_5-K_2O		Stubble cane	Stalk		Normal juice		Sugar
Fall	Spring	yield	No.	Wt.	Brix	Sucrose	yield
lbs./A	lbs./A	T/A	1000/A	lbs.	%	%	lbs./A
		Succession - No Furadan					
0-0-0	120-0-80	32.2	26.1	2.82	16.0	13.1	5956
	240-0-160	32.9	26.8	2.56	15.8	12.9	5944
90-90-90	120-0-80	38.4	29.2	2.77	16.6	13.7	7467
	240-0-160	36.8	30.0	3.16	16.6	13.8	7212
		Succession - 10 lbs/A Furadan					
0-0-0	120-0-80	39.4	28.4	2.94	15.9	13.0	7196
	240-0-160	39.7	28.3	2.98	16.3	13.5	7562
90-90-90	120-0-80	39.5	30.1	2.63	16.3	13.3	7382
	240-0-160	39.0	29.5	2.70	16.1	13.3	7321
HSD .05		3.4	NS	NS	NS	NS	1295

The succession cane was planted immediately following a harvested crop of second stubble cane in 1984. Cane variety CP 70-321 was planted in the test and the fall fertilizer treatment was applied at planting time, the spring fertilizer was applied in April and the furadan was applied at planting time and in April, 1985.

The extractable soil K, Ca, Mg and P were 117, 2036, 360 and 106 ppm, respectively, with a soil organic matter of 0.99% and pH 6.2.

Table 7. Effect of fall and spring application of fertilizers on the yield and yield components of first stubble cane planted in succession and after a fallow year on Commerce silt loam soil at the St. Gabriel Research Station, 1985.

Fertilizer $N-P_2O_5-K_2O$		Stubble cane	Stalk		Normal juice		Sugar
Fall	Spring	yield	No.	Wt.	Brix	Sucrose	yield
lbs./A	lbs./A	T/A	1000/A	lbs.	%	%	lbs./A
		Succession CP 74-383					
0-0-0	120-0-80	33.8	39.8	2.33	15.0	12.0	5572
	240-0-160	37.6	36.8	2.36	15.3	12.5	6548
90-90-90	120-0-80	33.6	33.7	2.28	15.5	12.6	5923
	240-0-160	36.2	34.3	2.43	14.9	12.1	6039
		Fallow CP 74-383					
0-0-0	120-0-80	33.7	35.5	1.95	16.0	13.2	6265
	240-0-160	31.5	39.7	2.09	15.9	13.2	6836
90-90-90	120-0-80	34.2	34.3	2.07	16.1	13.4	6471
	240-0-160	35.9	34.7	2.03	15.1	12.2	6080
HSD .05		2.5	NS	NS	NS	NS	NS

The succession cane was planted immediately following a harvested cane crop and the fallow cane was planted after a fallow year between cane cycles in 1983. Variety CP 74-383 was planted in the test and the first stubble cane was fertilized in April and harvested in November, 1985.

The extractable soil K, Ca, Mg and P were 79, 2274, 389 and 200 ppm, respectively, with a soil organic matter of 1.16% and pH 7.6.

Table 8. Effect of rates of fertilizer application on the yield and yield components of two varieties of second stubble cane planted in succession and after a fallow year on Commerce silt loam soil at the St. Gabriel Research Station, 1985.

Fertilizer applied $N-P_2O_5-K_2O$	Stubble cane yield	Stalk		Normal juice		Sugar yield
		No.	Wt.	Brix	Sucrose	
lbs/A	T/A	1000/A	lbs.	%	%	lbs/A
		Succession CP 65-357				
120-0-80	25.1	29.5	2.07	16.9	14.0	5020
240-0-160	24.5	28.8	2.20	16.1	13.0	4462
360-0-240	26.3	30.3	2.13	16.2	13.2	4870
		Fallow CP 65-357				
120-0-80	21.7	26.3	2.07	15.4	12.5	3813
240-0-160	23.3	24.0	1.85	15.6	12.6	4102
360-0-240	24.2	27.5	2.04	15.3	12.1	4013
		Succession CP 72-370				
120-0-80	25.1	28.0	2.16	16.0	13.4	4751
240-0-160	28.2	23.2	2.09	15.4	12.6	4951
360-0-240	28.0	21.8	2.05	14.9	11.9	4576
		Fallow CP 72-370				
120-0-80	25.7	29.0	2.06	15.9	13.1	4699
240-0-160	26.9	23.3	2.14	14.9	12.0	4459
360-0-240	26.6	24.7	2.17	15.8	12.8	4770
HSD .05	5.7	NS	NS	NS	NS	NS

The succession cane was planted immediately following a harvested cane crop and the fallow cane was planted after a fallow year between cane cycles in 1982. The fertilizer treatments were applied in April to plant cane in 1983, first stubble in 1984 and second stubble in 1985.

The extractable soil K, Ca, Mg and P were 87, 1621, 263 and 166 ppm, respectively with a soil organic matter of 1.07% and pH 6.3. The soil sample was taken on the fallow land.

Table 9. Effect of rates and method of fertilizer application on the yield and yield components of plant cane on a Commerce silt loam soil at the St. Gabriel Station, 1985.

Fertilizer applied $N-P_2O_5-K_2O$	Method of application	Plant cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
lb/A		T/A	1000/A	lbs.	%	%	lbs/A
0-0-0	-	28.9	25.7	2.38	17.3	14.6	6049
80-0-0	Band	31.8	28.5	2.33	17.4	14.5	6635
80-0-80	Band	34.7	29.0	2.45	17.3	14.5	7198
80-0-80	BC	32.3	29.1	2.50	17.1	14.4	6625
160-0-0	Band	32.6	27.8	2.50	17.1	14.3	6657
160-0-80	Band	34.2	27.5	2.39	17.4	14.8	7238
160-0-80	BC	31.6	27.7	2.29	17.3	14.6	6594
160-0-160	Band	34.0	29.6	2.53	16.8	14.0	6805
160-0-160	BC	34.0	28.5	2.42	16.7	14.0	6724
HSD .05		4.3	NS	NS	NS	NS	956

BC = Broadcast

The experiment was conducted with variety CP 74-383 and the cane was fertilized in April and harvested in December, 1985. The band application was made in the off-bar furrow and the broadcast application was made on the entire soil surface of the plot.

Table 10. Effect of rates of fertilizer application on the yield and yield components of first stubble cane on Commerce silt loam soil at the St. Gabriel Research Station, 1985.

Fertilizer applied $N-P_2O_5-K_2O$	Stubble Cane yield	Stalk		Normal juice			Sugar yield
		No.	Wt.	Brix	Sucrose	Purity	
lbs./A	T/A	1000/A	lbs.	%	%	%	lbs./A
0-0-0	27.2	23.9	2.06	16.6	13.7	82.7	5267
120-0-0	33.6	29.3	2.33	16.7	13.7	82.0	6525
120-0-60	33.9	29.8	2.31	16.6	13.6	82.3	6564
120-0-120	35.8	30.6	2.47	16.1	13.2	82.1	6626
120-0-180	35.5	29.9	2.48	16.9	13.6	80.5	6832
240-0-60	36.3	31.4	2.59	16.7	13.4	79.9	6857
240-0-120	36.9	30.3	2.59	15.6	12.5	79.9	6389
240-0-180	34.5	28.2	2.63	16.5	13.2	80.0	6396
HSD .05	5.8	6.5	NS	NS	NS		1430

The experiment was conducted with variety CP 72-370 and the cane was planted using the wide furrow method of planting, fertilized in April and harvested in November, 1985.

The extractable soil K, Ca, Mg and P were 62, 1566, 277 and 249, respectively, with a soil organic matter of 1.47% and pH 6.8. The soil sample was taken on the untreated check plot.

Table 11. Effect of rates of fertilizer and cane bagasse applications on the yield and yield components of second stubble on a Commerce silt loam soil on Cinclare Plantation, Port Allen, La., 1985.

Cane bagasse applied	Fertilizer applied $N-P_2O-K_2O$	Stubble cane yield	Normal juice		Sugar yield
			Brix	Sucrose	
T/A	lbs./A	T/A	%	%	lbs./A
0	0-0-0	19.4	16.9	14.0	3876
	160-0-90	25.4	17.9	15.1	5542
30	0-0-0	20.8	17.4	14.6	4362
	160-0-90	24.3	17.7	14.8	5173
	320-0-180	24.1	17.2	13.9	4767
60	0-0-0	24.0	17.6	14.7	5074
	160-0-90	23.3	17.6	14.4	4812
	320-0-180	25.0	17.6	14.5	5205
HSD .05		3.8	0.3	0.4	814

The bagasse was broadcasted and disked into the surface soil prior to building rows for planting during the fallow year in 1982. The test was conducted with CP 70-321 and the cane was fertilized in April and harvested in November, 1985.

The extractable soil K, Ca, Mg and P were 117, 2276, 369 and 228 ppm, respectively, with a soil organic matter of 1.83% and pH 6.0. The soil sample was taken on the untreated check plot.

Table 12. Effect of rates of mined gypsum on the yield and yield components of plant cane on a Sharkey clay soil at Judice Farm in Iberia Parish, 1985.

Gypsum applied	Plant cane yield	Stalk			Normal juice		Sugar yield
		No.	Wt.	Length	Brix	Sucrose	
Tons/A	T/A	1000/A	lbs.	in.	%	%	lbs/A
0	29.6	24.5	2.42	74.5	17.0	13.6	5708
1	30.7	24.5	2.51	76.5	17.4	14.2	6224
2.5	30.5	23.4	2.61	75.7	16.8	13.5	5801
5	31.4	24.4	2.57	76.7	16.9	13.6	6051
10	33.4	25.6	2.61	78.9	16.9	13.7	6475
HSD .05	NS	2.1	NS	NS	NS	NS	NS

Table 13. Effect of date of harvest plant cane on the yield of the subsequent stubble cane of four varieties on Commerce soil on the St. Gabriel Research Station, 1985.

Variety of cane	Date of plant cane harvest	Stubble cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
		T/A	1000/A	lbs.	%	%	lbs./A
CP 65-357	Sept. 1	25.0	26.4	2.47	18.3	15.3	5524
	Oct. 1	25.1	21.6	1.88	18.1	14.9	5408
	Nov. 1	32.8	27.0	2.17	18.1	14.9	7033
	Dec. 1	32.4	22.2	2.17	17.7	14.6	6778
CP 70-321	Sept. 1	27.2	32.7	2.53	17.6	14.7	5750
	Oct. 1	28.0	24.9	2.31	18.2	14.5	5830
	Nov. 1	29.8	25.4	2.56	17.6	14.6	6254
	Dec. 1	36.2	29.7	2.56	18.2	15.3	7989
CP 72-370	Sept. 1	28.5	30.0	2.54	17.3	14.3	5821
	Oct. 1	31.0	27.8	2.31	17.0	13.8	6045
	Nov. 1	33.6	28.8	2.23	16.8	13.6	6470
	Dec. 1	37.0	27.5	2.46	17.1	14.1	7446
CP 74-383	Sept. 1	32.7	35.3	2.54	17.5	14.4	6744
	Oct. 1	39.5	32.0	2.29	17.5	14.5	8202
	Nov. 1	41.5	36.4	2.62	16.9	13.9	8213
	Dec. 1	43.9	33.1	2.62	17.7	14.7	9248
HSD .05		5.8	13.9	0.50	1.4	1.4	1361
			Mean date effect				
	Sept. 1	28.8	31.1	2.52	17.7	14.7	5960
	Oct. 1	30.3	26.6	2.20	17.7	14.4	6371
	Nov. 1	34.4	29.4	2.40	17.3	14.3	6993
	Dec. 1	37.4	28.1	2.45	17.7	14.7	7865
HSD .05		2.1	NS	0.18	NS	NS	496

Table 14. Effect of date of harvest on the yield of four varieties of plant cane on Commerce soil on the St. Gabriel Research Station, 1985.

Variety of cane	Date of harvest	Plant cane yield	Stalk wt.	Normal			Sugar yield
				Brix	Sucrose	Purity	
		T/A	lbs.	%	%	%	lbs./A
CP 65-357	Oct. 7	35.9	2.41	16.6	13.3	79.9	6710
	Nov. 11	39.6	2.66	17.4	14.6	84.1	8209
	Dec. 9	41.3	2.57	17.0	14.4	84.5	8528
CP 70-321	Oct. 7	38.1	2.43	15.8	12.6	79.5	6669
	Nov. 11	39.4	2.97	16.6	14.1	84.7	7920
	Dec. 9	40.3	3.02	16.7	14.2	85.2	8170
CP 72-370	Oct. 7	32.1	2.52	16.5	13.5	82.0	6139
	Nov. 11	36.6	2.99	16.4	13.8	84.2	7198
	Dec. 9	39.4	2.92	15.9	13.3	83.4	7375
CP 74-383	Oct. 7	36.9	2.56	15.4	12.0	78.0	6124
	Nov. 11	46.0	2.75	16.5	13.8	83.6	9023
	Dec. 9	46.9	2.53	14.9	12.4	83.2	8119
HSD .05		3.7	0.57	1.5	1.4		1319
			Mean date effect				
	Oct. 7	35.8	2.48	16.1	12.8	79.9	6411
	Nov. 11	40.4	2.84	16.7	14.1	84.2	8109
	Dec. 9	42.0	2.76	16.1	13.6	84.1	8048
HSD .05		1.3	0.20	0.5	0.5		456

Table 15. Effect of stubble protection after three harvest dates of two cane varieties on the yield of the subsequent stubble crop on the St. Gabriel Research Station, 1985.

Date of harvest	Stubble protection treatment	Cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
		T/A	1000/lbs.	lbs.	%	%	lbs./A
			CP 65-357				
Sept. 1	Check	27.5	26.7	2.42	17.7	14.9	5892
	Cover	31.5	26.2	2.21	18.1	15.1	6874
Oct. 1	Check	17.7	16.9	2.36	15.9	12.9	3221
	Cover	23.5	20.6	2.47	17.1	14.3	4798
Nov. 1	Check	27.8	23.5	2.49	17.3	14.5	5764
	Cover	32.1	31.9	2.68	17.2	14.4	6602
			CP 72-370				
Sept. 1	Check	30.6	26.9	2.56	16.6	13.9	6037
	Cover	34.9	26.3	2.25	16.8	14.0	6933
Oct. 1	Check	21.7	23.0	2.55	15.7	12.9	3936
	Cover	29.9	25.4	2.62	16.1	13.5	5696
Nov. 1	Check	34.7	28.1	2.42	16.3	13.7	6744
	Cover	39.0	33.6	2.69	16.6	13.7	7602
HSD .05		4.0	8.5	NS	1.6	1.7	1024
			Mean cover effect				
	Check	26.7	24.2	2.47	16.6	13.8	5266
	Cover	31.8	27.3	2.49	17.0	14.2	6417
HSD .05		0.9	2.0	NS	NS	NS	239

The cane stubble was protected from freeze damage by covering it with soil prior to a freeze in late November, 1984. The soil cover was removed in early spring and stubble crop was harvested in November, 1985.

Table 16. Effect of stubble protection after harvesting sugarcane planted by four planting methods on the yield of the subsequent stubble crop on the St. Gabriel Research Station, 1985.

Drill width	Stubble protection treatment	Cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
in.		T/A	1000/lbs.	lbs.	%	%	lbs./A
V	Check	26.0	20.1	1.92	16.1	12.8	4630
	Cover	29.2	23.4	1.75	16.5	13.2	5447
18	Check	26.8	17.0	1.94	16.6	13.4	5070
	Cover	29.9	26.5	1.86	16.3	13.1	5494
24	Check	25.0	20.4	1.86	16.3	13.0	4535
	Cover	29.6	25.4	1.92	16.2	13.1	5420
36	Check	23.7	17.6	1.94	16.5	13.3	4468
	Cover	29.7	23.8	1.93	16.1	12.9	5362
HSD .05		4.4	NS	NS	NS	NS	931
			Mean cover effect				
	Check	25.3	18.7	1.91	16.4	13.1	4676
	Cover	29.6	24.7	1.87	16.3	13.1	5431
HSD .05		1.3	3.0	NS	NS	NS	284

The cane stubble of varieties CP 65-357 and CP 72-370 were protected from freeze damage after harvesting by covering it with soil prior to a freeze in 1984. The soil cover was removed in early spring and the stubble crop was harvested in November, 1985. The data are an average of the two varieties.

Table 17. Effect of current varieties on the yield and longevity of stubble crops of sugarcane on a Commerce soil at the St. Gabriel Station, 1983-85.

Variety of cane	Cane yield			Sucrose			Sugar yield		
	Plant 1983	1st St. 1984	2nd St. 1985	Plant 1983	1st St. 1984	2nd St. 1985	Plant 1983	1st St. 1984	2nd St. 1985
	----------Tons/A----------			----------%----------			----------lbs/A----------		
CP 65-357	33.3	21.7	19.5	13.4	13.9	14.7	6297	4291	4104
CP 70-321	37.0	24.0	20.1	13.8	13.7	13.7	7269	4699	3907
CP 70-330	38.8	20.7	22.7	13.3	14.2	13.6	7263	4194	4390
CP 72-356	33.0	26.5	8.8	13.2	14.7	14.3	6148	5615	1817
CP 72-370	34.4	18.2	14.6	12.9	12.9	13.1	6239	3295	2675
CP 74-383	44.4	32.8	34.9	11.6	13.3	12.9	7029	6147	6302
HSD .05	3.2	3.8	4.4	1.3	1.4	0.8	965	1007	833

The varieties were planted in 1982 and harvested as plant cane in 1983, first stubble in 1984 and second stubble cane in 1985. Normal cultural practices were used during each growing season.

Table 18. Effect of varieties and Furadan nematocide on the yield of plant cane on a Commerce soil at the St. Gabriel Station, 1985.

Variety of cane	Furadan applied	Plant cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
	lbs/A	T/A	1000/A	lbs.	%	%	lbs/A
CP 70-321	0	34.4	27.0	3.12	16.0	13.7	6691
	10	36.8	29.9	2.86	16.5	14.0	7343
CP 72-370	0	33.3	24.6	2.70	15.7	13.3	6245
	10	37.6	28.7	2.61	16.2	13.8	7352
CP 74-383	0	44.7	32.4	2.74	15.1	12.5	7787
	10	45.2	32.9	2.36	15.7	12.9	8135
HSD .05		3.5	4.1	0.64	NS	NS	1168
			Mean Furadan effect				
	0	37.4	28.0	2.85	15.6	13.2	6908
	10	39.9	30.5	2.61	16.1	13.5	7610
HSD .05		1.3	1.5	0.24	NS	NS	433

The Furadan treatment was applied on the planting furrow in 1984 and again in the off-bar furrow in April, 1985. A stubble protection treatment consisting of covering the cane stubble with soil after harvesting the plant cane in 1985 was applied to another part of this test.

Sweet Sorghum for Biomass and Sugar Production in Louisiana

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Experiments were conducted in 1985 to determine the potential of growing sweet sorghum as a biomass and sugar fermentation feedstock for the production of fuel alcohol. The experiments consisted of variety tests on Commerce silt loam soil at the St. Gabriel Research Station and on a Moreland clay soil at the Dean Lee Research Station.

St. Gabriel Test

The varieties planted in this test were Wray, Keller, Theis, M81E, Mer. 76-6, Mer. 71-1 and NK 405. The NK 405 cultivar is a hybrid from crossing sweet sorghum and grain sorghum provided by Northrup King Seed Company. The sorghum plots were planted in April and each variety was harvested at its mature stage. The plots were planted in two drills, 22 inches apart on rows spaced six feet apart. The plant spacing was three plants per foot in each drill. The plots were three rows wide and 50 feet long with three replications of each variety. This method of planting was chosen to accommodate sugarcane harvesting equipment.

A 13-13-13 fertilizer at the rate of 500 pounds per acre was bedded in the rows prior to planting. Ammonium nitrate at the rate of 500 pounds per acre was applied as a top-dress application when the plants were about 10 inches tall. Milogard was used as a preemergence herbicide and Guthion was used to control sugarcane borers. Furadan was applied at planting time to control lesser corn borers.

The yield components and yield of stalks, leaves and tops were measured at the mature stage of each variety. The percent brix or total sugar solids and sucrose in the sorghum juice and percent fiber in the stalks were measured at harvest time of each variety. The brix and sucrose were determined with a refractometer and polariscope, respectively. The total fermentable sugars were calculated from a predetermined relationship between liquid chromatograph analyses for total sugars and brix analyses expressed by the equation % total sugars = % Brix - .70. The alcohol yield was calculated from the theoretical conversion of .07 gallon of alcohol per pound of fermentable sugar.

Biomass yield. The data obtained on biomass yield in the St. Gabriel test are reported in Table 1. The plant population on each plot was adjusted by thinning to a stand of approximately 40,000 plants per acre. The differences in population at harvest time were due to the differences among varieties in the survival ability of the plants. Some plants died after thinning to the desired stand. Apparently Wray had a higher mortality than the other varieties. The average millable stalk weight ranged from 1.05 pounds with NK 405 to 1.73 pounds with Theis and M81E. In prior years, NK405 produced a higher stalk weight at this location.

The fiber content in the stalks which indicates percent juice extraction ranged from 11.0% with Mer. 76-6 to 16.7% with Theis. The net stalk yield without leaves and tops ranged from 20.7 T/A with Wray to 27.9 T/A with Theis averaging for all varieties 83.3% of the total plant weight. The percent leaves which were mostly still green at harvest ranged from 10.0% with Mer. 76-6 to 14.9% with M81E. The percent tops which included the seed heads, ranged from 2.3% with Wray to 8.4% with Mer. 76-6. The relatively low seed yield with the Wray variety could be a problem in seed production for commercial plantings. The total biomass yield, which included the stalks, leaves and tops ranged from 24.5 T/A with Wray to 33.6 T/A with Theis.

Sugar and alcohol yield. The sugar and alcohol yield data obtained for each variety are reported in Table 2. The brix, sucrose and total sugars in the sorghum juice are expressed as percent of stalk weight and not of extracted juice. The percent brix ranged from 9.2% in NK 405 to 17.1% in the Wray variety and percent sucrose ranged from 5.5% in NK 405 to 14.2% in Wray. The total fermentable sugars and alcohol yields were lowest with NK405 producing 4044 lbs./A and 283 gal/A, respectively and highest with Wray producing 6824 lbs./A and 478 gal/A, respectively. The Wray variety was lowest in stalk yield, but highest in sugar and alcohol yield.

Dean Lee Test

The sweet sorghum varieties planted in the Dean Lee test were Wray, Keller, Theis, M81E, Mer. 76-6 and NK 405. The sorghum was planted in April in single drills on rows 40 inches wide and each variety was harvested at its mature stage. Plant spacing was three plants per foot of row. The plots were four rows wide and 48 feet long with four replications of each variety. The cultural practices and experimental procedures used in this test were similar to the ones described for the St. Gabriel test.

Biomass yield. The data obtained on biomass yield in the Dean Lee test are reported in Table 3. The average millable stalk weight ranged from 1.25 lbs. with Wray to 2.07 lbs. with the Theis variety. The fiber content in the stalks ranged from 11.3% with Mer. 76-6 to 17.8% with NK 405. The net stalk yield ranged from 22.6 T/A with Wray to 37.5 T/A with Mer. 76-6. The percent leaves ranged from 11.6% with Wray and Theis to 17.4% with M81E. The percent tops ranged from 3.3% with Wray to 6.7% with NK 405.

Sugar and alcohol yield. The sugar and alcohol yield data obtained in the Dean Lee test are reported in Table 4. The sugar contents are expressed as percent of total stalk weight. The percent brix ranged from 10.7% with Theis to 17.8% with Wray and percent sucrose ranged from 5.2% with Theis to 14.4% with Wray. The total fermentable sugars and alcohol yields were lowest with Theis producing 7486 lbs./A and 524 gal./A, respectively and highest with Mer. 76-6 producing 9202 lbs./A and 644 gal/A, respectively.

General Comments

The yields of stalks, sugars and alcohol were higher for each variety tested on the Moreland clay at the Dean Lee Station than on the Commerce silt loam soil at the St. Gabriel Station. The Wray and Keller varieties are considered sugar varieties and the others tested are sirup varieties. The sugar varieties are higher in percent sucrose and total fermentable sugars but not necessarily in yield per acre.

Table 1. Effect of varieties on the biomass yield of sweet sorghum at maturity on a Commerce sil soil, St. Gabriel Research Station, 1985.

Sorghum Variety	Stalk		Stalk fiber		Stalk yield		Leaves yield		Tops yield		Total yield
	No. 1000/A	Wt. lbs.	%	T/A	%	T/A	%	T/A	%	T/A	T/A
Wray	29.7	1.49	11.3	2.4	84.6	20.7	13.1	3.2	2.3	0.6	24.5
Keller	31.8	1.33	13.6	2.9	85.6	21.1	11.8	2.9	2.6	0.6	24.7
Theis	32.1	1.73	16.7	4.7	83.2	27.9	10.7	3.6	6.0	2.0	33.6
M81E	30.9	1.73	15.0	4.0	80.8	26.8	14.9	4.9	4.4	1.5	32.8
Mer. 76-6	34.4	1.43	11.0	2.9	81.6	26.3	10.0	3.3	8.4	2.7	32.2
Mer. 71-1	32.7	1.42	11.4	2.7	85.0	24.2	11.3	3.2	3.8	1.1	28.4
NK 405	34.9	1.05	16.2	3.7	82.5	23.0	12.0	3.4	5.5	1.6	27.9
HSD .05	3.3	0.29	2.5	0.9	4.6	4.9	2.8	1.1	3.8	1.2	5.9

Table 2. Effect of varieties on the sugar and alcohol yield of sweet sorghum on a Commerce sil soil, St. Gabriel Research Station, 1985.

Sorghum variety	Sugar yield in stalks at maturity					Alcohol yield
	Brix	Sucrose		Total Sugars		
	%	%	lbs./A	%	lbs./A	gal./A
Wray	17.1	14.2	5883	16.4	6824	478
Keller	15.7	12.8	5419	15.1	6390	447
Theis	11.5	6.1	3408	11.0	6157	431
M81E	12.1	7.8	4208	11.7	6283	440
Mer. 76-6	10.6	5.4	2855	10.2	5383	377
Mer. 71-1	14.4	9.7	4638	13.8	6645	465
NK 405	9.2	5.5	2545	8.8	4044	283
HSD .05	1.6	2.3	1459	1.5	1487	104

Table 3. Effect of varieties on the biomass yield of sweet sorghum at maturity on a Moreland clay soil, Dean Lee Research Station, 1985.

Sorghum variety	Stalk wt.	Stalk fiber		Stalk yield		Leaves yield		Tops yield		Total yield
	lbs.	%	T/A	%	T/A	%	T/A	%	T/A	T/A
Wray	1.25	14.3	3.2	85.1	22.6	11.6	3.1	3.3	0.9	26.6
Keller	1.26	15.0	3.6	83.7	24.2	12.8	3.7	3.5	1.0	28.9
Theis	2.09	17.7	6.4	84.4	36.3	11.6	5.0	4.0	1.7	43.0
M81E	1.98	15.6	5.4	78.2	34.9	17.4	7.8	4.4	2.0	44.6
Mer. 76-6	2.07	11.3	4.2	79.0	37.5	15.0	7.1	6.1	2.9	47.5
NK 405	2.02	17.8	6.5	79.2	36.3	14.2	6.5	6.7	3.1	45.9
HSD .05	0.10	2.6	1.0	5.8	2.9	3.8	1.6	3.4	1.6	3.3

Table 4. Effect of varieties on the sugar and alcohol yield of sweet sorghum at maturity on a Moreland clay soil, Dean Lee Research Station, 1985.

Sorghum variety	Sugar yield in stalks at maturity					Alcohol yield
	Brix	Sucrose		Total Sugars		
	%	%	lbs./A	%	lbs./A	gal./A
Wray	17.8	14.4	6519	17.2	7774	544
Keller	17.6	13.8	6661	16.9	8154	571
Theis	10.7	5.2	3743	10.3	7486	524
M81E	13.3	8.6	5994	12.8	8920	625
Mer. 76-6	12.7	5.8	4331	12.3	9202	644
NK 405	12.5	7.3	5269	12.0	8680	608
HSD .05	1.7	2.3	1450	1.7	1070	75

The Department of Agricultural Economics and Agribusiness Research Program for Sugarcane and Related Crops in South Louisiana 1985

Arthur M. Heagler and Brian A. Chapman
Department of Agricultural Economics and Agribusiness

I. Micro research activities:

Annual cost of production and returns projections for sugarcane were published in January.[1] The data base was expanded to account for regional differences in agronomic input requirements and interregional differences in agronomic inputs by soil type, and output differentials by soil type and ratoon age.

A sophisticated simulation model for commercial sugarcane farms using 3-row machinery was completed. The model was used to address a variety of farm related questions dealing with size economies, resource allocation, cropping system alternatives, and harvesting options.

Model results indicated considerable size economies (a declining cost per unit of output) could be expected as farm acreage increased from 200 to 800 acres. However, continued expansion provided little or no additional size economies. The analysis indicated expansion beyond 800 acres was feasable as there was considerable margin between per unit output cost and price.

An in-depth resource allocation analysis indicated the proportion of machinery capital invested in harvesters and tractors is high, ranging between 41 and 70 percent of total machinery capital, for the various cropping and harvesting options considered. These two items play a central role in matching farm acreage and machinery effectively.

A detailed study of the 2-row sugarcane harvester was completed. This analysis indicated that a cane farmer in Louisiana must have at least 650 acres of total land (488 acres in cane) to justify a 2-row harvester. As acreage is increased beyond this level the 2-row harvester predominates.

Modification of the fallow portion of the sugarcane rotation was studied. Shifting from an idle fallow practice to a wheat fallow practice was evaluated. Custom and ownership options for the grain harvester were evaluated in the analysis. The results of this analysis show that the inclusion of wheat in the sugarcane production cycle is justified for farms of 820 acres and larger when a farmer-owned combine is used and for farms with more than 340 acres when the wheat is custom harvested at $24.20 per acre.

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[1] D.A.E. Research Report No. 647, Projected Costs and Returns, Sugarcane, Louisiana, 1986.

These results were published in a M.S. thesis titled: An Economic Analysis of the Cost Structure and Supply Response of Commercial Sugar Cane Farms in Louisiana and D.A.E. Research Report No. 651.

An intensive interdisplinary study of the economic feasibility of subsurface drainage and its impact on sugarcane costs and returns was carried out. This work indicated the additional output response obtained on well drained sandy and silt loam soils is not sufficient to offset the variable and fixed costs associated with the installation and operation of the most effective subsurface drainage system. However, the economic results for poorer drained silty clay loams were more favorable, indicating a fair return on such an investment could be obtained.

These results were presented at the Annual Meeting of the Florida and Louisiana Sections of the American Society of Sugarcane Technologists and will be published in the Journal, American Society of Sugarcane Technologists.

11. Raw Sugar Factory Research Activities:

Data related to the cost and returns of raw sugar factories in Louisiana for crop years 1979 through 1983 have been collected, analyzed, and prepared for publication. All of the data for the 1984 crop year were not available until September of 1985. Before these data were collected, it was decided that the analysis would provide more meaningful information if physical data, rather than financial data, served as the basis for this study. Therefore, the publication to be released this summer will include only the analysis of crop years 1979 through 1983. Toward the end of 1985, preparations were made to collect physical data on factory activities back to the 1979 crop year.

SOIL AND WATER MANAGEMENT

Cade E. Carter and Bruce Halverson
USDA - Agricultural Engineering

Sugar yield increased by Subsurface Drainage:

Sugar yields were increased up to 1242 lbs/A by subsurface drainage in 1985. The largest increase among the three subsurface drainage experiments located in St. James, Iberia, and St. Mary Parishes was measured at Graugnard's in St. James Parish. The experiment was on Commerce silt loam soil and the sugarcane was variety CP 70-321, third stubble.

At Patout's in Iberia Parish the area with subsurface drains spaced 90 feet apart yielded 746 lbs/A more sugar than did the nondrained area. This experiment was on Jeanerette silty clay loam soil and the sugarcane was variety CP 70-321, first stubble.

At Sterling's in St. Mary Parish, the subsurface drained area yielded 430 lbs/A more sugar than did the nondrained area. This experiment was on Baldwin silty clay soil and the sugarcane was variety CP 70-321, plant crop.

Stand Longevity increased by Subsurface Drainage:

The number of stubble crops may be increased at least one and perhaps two with subsurface drainage. Stubble crop enhancement was reported in the 1984 Sugarcane Annual Report and reaffirmed in 1985 by data from the subsurface drainage experiment at Graugnards in St. James Parish. Sugar yield in the subsurface drained area declined from 7777 to 4838 lbs/A from the plant crop in 1982 to the third stubble in 1985, an average rate of decline of 960 lbs/A/yr. Sugar yield in the nondrained area declined from 7720 to 3596 lbs/A from the plant crop in 1982 to third stubble in 1985, an average rate of decline of 1360 lbs/A/yr.

The fact that subsurface drainage not only boosts sugar yield but also increases the number of stubble crops enhances the use of subsurface drainage for sugar production in Louisiana.

Sugar Yields increased by Water Management:

The water management system installed on the Dugas and LeBlanc plantation in Paincourtville during 1983 and 1984 was used effectively in 1985. The 17-acre water management system consists of a network of underground drains that empty into three sumps equipped to pump drain outflow into surface drainage ditches during rainy, wet conditions. Irrigation wells, one for each sump, were installed and equipped to pump water into the sumps and throughout the subsurface drain network to provide subirrigation during droughts. The pumps for drainage and irrigation are controlled by switches activated by the water level in the sumps. During 1984, the system was used only in the subsurface drainage mode. In 1985, the system was used in the drainage mode during the winter and early spring months when the water table was high, then switched to the subirrigation mode in the summer during a drought. In the subirrigation mode, the irrigation water added to the sump caused the water table to rise

into the cane's root zone for short durations, just long enough to replenish the water in the soil that had been used by the cane plants or lost to evaporation.

In 1984, when subsurface drainage only was used, sugar yield from the drained area was 738 lbs/A more than that from the nondrained area. In 1985 when both drainage and irrigation were used, sugar yield from the water management area was 1469 lbs/A more than that from the area without water management. The experiment was not set up to determine how much of the yield increase was due to drainage or to irrigation; thus the increase is simply reported as due to water management. This experiment is on Commerce silt loam soil and the sugarcane was variety CP 70-321, plant and first stubble crops in 1984 and 1985, respectively.

FACTORS AFFECTING MECHANICAL HARVESTING AND PRODUCTION EFFICIENCY OF SUGARCANE

R. L. Parish and P. P. Chaney
Agricultural Engineering Department

Automation of Drum Planters:

An automatic control system for a drum-type sugarcane planter has been developed and tested. The system uses a pressure switch in the line to the drum motor to activate the table feed. This system has been shown to deliver uniformity slightly better than the uniformity possible with manual operation. Manual operation resulted in a coefficient of variation of 59-71%, compared to 45% for automatic operation. This means that the operator on the planter is no longer needed. This is a reduction in labor of 25-40% for the most labor-intensive operation in cane farming. Two other sensing methods, a photocell to detect cane dropping to the ground and a mechanical sensor to detect the mass of cane leaving the planter, were tested and found to be inferior to pressure sensing. Variable drum speed was tested and found to be unnecessary.

Feedback Control of Harvester Topper Height:

A feedback control system for the topper height control cylinder on a sugarcane harvester was developed and tested. The system was found to be precise and repeatable. The system automatically compensates for leaks in use or leak-down when not in use.

Publications:

Chaney, P. P., R. L. Parish and F. E. Sistler. 1986. An automatic control system for a sugarcane planter. ASAE paper number SWR-86-001.

Parish, R. L., P. P. Chaney and F. E. Sistler. 1985. Evaluation of a modified air carrier sprayer in sugarcane. Transactions of the ASAE 29(1):34-36.

Sverzut, C. B. and R. L. Parish. 1985. Electrical control for hydraulic cylinders on harvesters. Paper presented at the Annual Meeting, American Society of Sugarcane Technologists, Fort Walton Beach, Florida.

EVALUATION OF PHYSICAL PROPERTIES OF SUGARCANE

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and

Claudio Sverzut, Graduate Student
Agricultural Engineering Department

OBJECTIVES:

1. To evaluate some physical properties of sugarcane using different forms of radiation.
2. To determine the correlation between the physical properties and the quality of sugarcane.

SUMMARY:

A research project to investigate the response of sugarcane samples to infrared, microwave, Gamma ray and radiofrequency radiation energy is underway in the Agricultural Engineering Department. Results of this investigation will be used to correlate these responses with the sugar, water, and fiber contents of the sugarcane. The stand density of the sugarcane crop in the field will also be correlated to some of the measured responses.

Microwave radiation was applied to dry shredded samples of sugarcane. The moisture content was determined through weighing process. Results were compared with those from conventional drying in a hot air oven. There were no significant differences between moisture values using the standard method or the heated air oven method with the method developed in this study ($p<0.01$). Considerable time can be saved in the analysis of sugarcane samples when a household microwave oven is used to determine their moisture content.

The NIR (near infrared) spectroscopy measured the light energy absorbed by the sugarcane sample at different wavelengths and varied with the sugar concentration, fiber content and water content of the sample. Relationships between the light energy absorbed and sugar, water and fiber contents were established. A fast and accurate method to determine these sugarcane constituents were developed using NIR spectroscopy. There was no significant difference between the values determined using the standard technique and the NIR method developed ($p<0.01$).

Gamma ray calibration with density of the sugarcane crop in the field will be attempted. The attenuation of the radiation depends on the density and the path length, thus correlation to the biomass in the field of sugarcane is possible.

The NMR (nuclear magnetic resonance) also will be used to estimate sugar, water and fiber content of samples of sugarcane. These measurements are made in relation to the amount of radiofrequency absorbed when the sample is exposed to a constant magnetic field. The amount of radiation absorbed by the sample will depend on the number of hydrogen nuclei present in the sample.

Sugarcane Physiology

M. E. Terry
Department of Plant Pathology and Crop Physiology

In an effort to see if the compound "Burst" would incease the concentration of sugar in two varieties of sugarcane (CP 70-321 & CP 65-357) the following experiment was done. Field plots of sugarcane were treated with 263 ml/HA, 536 ml/HA, or 1051 ml/HA of Burst and gibberellic acid. A third application to a second set occurred on August 9th. However, due to heavy damage caused by hurricane Juan, only the first set of CP 70-321 was harvested. Most of the plants harvested exhibited severe lodging. All three rates of Burst caused small increases in fresh weight, brix, and pol; but the data was not significant at the 0.05 level.

The possibility of using Burst as a sugarcane ripener was also examined in a second experiment. The three rates of Burst previously mentioned were applied on October 8th, The sugarcane was harvested four weeks later. The results of this treatment showed no effect was made on fresh weight, brix or pol. This could, in part, be due to the hurricane Kate. Further study should be done to assess Burst as a possible ripener.

The use of fusilade as a sugar enhancer was also studied. The commercial sugarcane variety CP 72-370 was treated once with 0.017, 0.035, 0.07 or 0.105 kg/HA fusilade. Plants were harvested two and four weeks later. All rates of fusilade, except the lowest rate at two weeks, increased the brix and pol. In several instances, plants treated with fusilade showed a decrease in fresh weight.

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Sugarcane Weed Control Annual Report 1985

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In 1985, major areas of research included: (1) tolerance of sugarcane to new or experimental herbicides; (2) long-term layby herbicide application studies; (3) use of Asulox/dalapon combinations for control of johnsongrass and itchgrass in sugarcane; (4) effect of Roundup drift on sugarcane yield; (5) weed control efficacy tests; (6) use of Oust and Roundup for ditchbank weed control; and (7) potential use of Rydex for weed control in sugarcane. A brief summary of these topics follows.

Tolerance of Sugarcane to New or Experimental Herbicides:

The 1985 sugarcane tolerance test conducted at St. Gabriel Research Station near St. Gabriel, Louisiana evaluated several new compounds for potential use in sugarcane. Injury ratings taken on May 24 indicated that most of the herbicides tested did not initially injure the sugarcane. A new compound from Riverside/Terra, RS-010, was tank mixed with Sen/Lex or Evik to determine if improved efficacy resulted. The tank mixes initially caused 17 to 20% injury to the sugarcane, primarily in the form of necrosis or leaf burn. By the June 10 evaluation, this injury decreased to 7 to 10%. The injury could not be attributed to RS-010, which caused no injury when applied alone. In addition, Sen/Lex caused no injury when tank mixed with Zorial, further indicating that the tank mix with RS-010 apparently increased overall activity of both compounds. RE-40885 or RE-40885 + RE-39571, two compounds developed by Chevron, caused the greatest injury observed in this test. On the May 24 evaluation, 30 to 37% injury was observed, primarily in the form of leaf bleaching and chlorosis. By the June 10 evaluation, this injury decreased to 20 to 26%. A major portion of the bleaching and chlorosis observed in the first evaluation had progressed to necrosis by the second evaluation. Because of inclement weather during the fall, the sugarcane at the experiment station lodged, resulting in highly variable stalk counts at harvest. Decreased stalk densities observed on the untreated plots were partially due to weed pressure on the study area. However, the study area was overlaid with Asulox applied at 3.34 lb/A which would be expected to minimize weed competition. None of the treatments with the exception of Zorial + Sen/Lex affected cane population. Stalk weights were relatively constant across all treatments. Yield components of sugarcane were not significantly affected by any of the herbicides tested. Zorial tank mixed with Sen/Lex caused the greatest decrease in commercially recoverable sugar, mostly due to a decrease in the sugarcane population. Application of all other herbicides resulted in yields equal to or greater than that of untreated plots. Initial injury observed with RS-010 + Sen/Lex or Evik and RE-40885 applied alone or tank mixed with RE-39571 did not appear to affect sugarcane yields. Compounds included in this test were the following:

1.	SC-5676 + RE-25788	Stauffer Chemical Company
2.	AC-263,499	American Cyanamid
3.	Zorial	Zoecon
4.	RS-010	Riverside/Terra
5.	Aatrex-90	Ciba-Geigy
6.	Asulox	Rhone-Poulenc
7.	Evik	Ciba-Geigy
8.	Treflan (4 lb/A)	Lilly Laboratories
9.	RE-39571	Chevron
10.	RE-40885	Chevron
11.	Classic	Du Pont
12.	Canopy	Du Pont

Long-Term Layby Herbicide Application Studies:

Long-term studies investigating the feasibility of increasing the stubbling years of sugarcane by use of layby herbicide application were continued. Herbicides continued to provide excellent control of broadleaf weeds, especially at the St. Mary Parish location. Unfortunately, yields were not obtained at the St. Mary location due to extensive hurricane damage. The Assumption Parish site had minimum weed pressure. Another site was initiated for this test at St. Gabriel. Weed pressure was also minimal at this site. These studies will be continued for 5 to 6 years.

Use of Asulox/Dalapon Combinations for Control of Itchgrass and Johnsongrass in Sugarcane:

This study was completed in 1985 and indicated that tank mixing Asulox and dalapon can result in decreased costs for the grower. Research shows that Asulox rates may be decreased to 2 lb a.i./A when tank mixed with dalapon at 3 lb/A. This combination results in johnsongrass control comparable to the recommended rate of Asulox alone at 3.34 lb/A. For itchgrass control, the same tank mix provides control superior to Asulox alone at 3.34 lb/A. Late application of these rates may result in some injury to the sugarcane, however, further research will be conducted to determine if this injury results in yield reductions. Laboratory tests indicated that improved activity of Asulox due to tank mixing with dalapon could not be explained by improved absorption and translocation of the compound. Asulox should not be applied as a sequential application following dalapon due to the fact that activity of the compound is depressed.

Effect of Roundup Drift on Sugarcane Yield:

A cooperative study with Dr. E. P. Richard at the U.S.D.A. Sugarcane Field Laboratory in Houma, Louisiana was initiated in 1985 to determine the effect of Roundup drift on sugarcane growth and yields. Preliminary data indicates that Roundup drift at rates as low as 0.25 lb/A can cause extensive damage to sugarcane.

Weed Control Efficacy Tests:

Herbicide efficacy studies were installed at Ben Hur Farm and Burden Research Plantation to test compounds for control of various weeds common in south Louisiana. Sugarcane herbicides in the tests included Treflan, Aatrex + RS-010, and RE-40885. Treflan applied preemergence at 4.0 lb/A provided good control of itchgrass and junglerice. Aatrex + RS-010 controlled a broad spectrum of broadleaf weeds, especially morningglories. However, the tank mix provided weed control similar to that of Aatrex applied alone. RE-40885 did not provide acceptable control of weeds in the study, probably due to drouth conditions at the time of application.

Use of Oust and Roundup for Ditchbank Weed Control:

One test site from 1984 was selected for continued application of Roundup and Oust for control of johnsongrass. The study agreed with results from 1984 which indicated that the best treatments using the lowest possible rates of the two herbicides were Oust at 0.06 to 0.13 lb/A + Roundup at 0.5 lb/A.

Potential Use of Rydex for Weed Control in Sugarcane:

Rydex, a dinitroaniline herbicide produced by Velsicol Chemical Company, was tested for sugarcane tolerance and weed control in 1985. The herbicide has a long soil residual life, thus it may be applied in the fall and will provide adequate weed control in the spring without a spring application. The compound will not control rhizome johnsongrass, but shows good potential for controlling itchgrass and other annual grasses with preemergence surface applications. Sugarcane yields were not adversely affected by the compound applied at rates less than 4.0 lb/A. Further research will be conducted in 1986.

Sugarcane Insects Ecology and Pest Management

GENE REAGAN
Annual Report LAES Project 2013
Department of Entomology

Integrated Pest Management

A 2-year (5-replication) split-plot treatment comparison of resistant (CP70-330), moderately resistant (CP65-357), and susceptible (CP61-37) sugarcane varieties to the sugarcane borer (SCB) Diatraea saccharalis (F.), was evaluated both with and without arthropod predators, showing a greater than 50% reduction in SCB damage ($P<0.05$) and a 14-fold reduced adult emergence with pest management components combined (resistant variety plus predatory arthropods). Use of the 2 management strategies in combination also substantially enhanced efficacy of insecticides for borer control. Based on this research the relative in-season contributions of the major management components toward sugarcane borer control are ascribed 26% to varietal resistance, 24% to predatory arthropods, and 50% to properly timed use of insecticides.

Predation Ecology

Studies comparing various sugarcane weed habitats showed that ant and spider predator groups could be enhanced and stabilized by a more abundant and diverse general arthropod fauna sustained on selected shallow rooted annual weeds. When these weeds were permitted at sub-economic injury levels, a 20% higher net returns per ha from pest management was demonstrated. Another study comparing the use of aldecarb for nematode control and fenvalerate for SCB control in various weed habitats demonstrated a reduction in predator system stability, as both aldecarb and fenvalerate significantly reduced several groups of beneficials. Sugarcane yield losses were not detected as a result of the nematode association with selected weed flora (first year of a 2-year study).

Another study cooperative with Dr. R. M. Knaus, LSU Nuclear Science Department, used daily observations for monitoring radiotracers and delineating the territorial areas of two fire ant, Solenopsis invicta Buren, colonies. The Zn-65 and Mn-54 labeled colonies were found to have discrete areas, averaging 21.4 m^2 and 14.0 m^2, respectively, with little or no interaction occurring among colonies. Temporally established foraging areas dynamically shifted, extending as far as 17.8 m from the mound. One colony was shown to forage significantly more bait stations during the day (mean=12.0) than at night (mean=9.5).

Host Plant Studies

Studies on the sugarcane borer population dynamics in sweet sorghum emphasized the development of an economic threshold and a delineation of the major mortality factors of D. saccharalis. In field plots, arthropod predators reduced adult SCB-moth populations 70% and provided an 11% increase in yield ($P<0.05$).

Varietal resistance studies of the L80 and L/CP79 sugarcane cultivar series (outfield) and the L82 (infield) showed that CP79-318, L82-94, -96, -46, -73, and L82-89 were comparable significantly to the commercially grown sugarcane borer moderately resistant variety CP65-357 ($P<0.05$). Extensive evaluations of 26 cultivars of the L83 series revealed that 4 were highly resistant, 7 resistant, and 2 in the moderate response range.

Insecticides

A small-plot insecticidal screening test (6-replication) showed alsystin (4F-0.1, 0.06 kg ai/ha), flucythrinate (2E-0.04, 0.03), (0.66EC-0.03) with higher ($P<0.05$) SCB control than azinphosmethyl (2L-0.84) which was better than furathiocarb (2EC-0.84, 0.06) and trimethacarb (50w-1.1). As shown in Table 1, evaluation of Pydrin (fenvalerate)-oil aerial application revealed no enhanced SCB control over traditional water-insecticide treatments. However, residue levels evaluated at 0, 1, 3, 5, and 7 days after application indicated that the oil/water formulated mixture provided a more efficient application (28.2 ppm versus 19.0 - water or oil) having a greater percentage of the pesticide reaching the target. This greater efficiency of application (oil/water) also resulted in twice as much residual (5.43 vs. 2.36 ppm) after 7 days. The two properly timed applications provided a 26% increase in commercially recoverable sugar per acre over untreated plots, but significantly reduced only Carabid predatory beetles and one group of spiders.

Table 1. Percent sugarcane borer infestation and damage, and sugarcane yield determinants in aerial application technology experiment at Graugnard Farms, 1985.

Treatment	Season Avg. % Infest.	% Bored Internodes	% Control	Brix	Polarity	Fiber	CRS/Acre *
Pydrin 0.12 lbs. Ai/A-mix (oil + water)	4.6a	4.2a	86.0	13.9a	11.8a	17.2a	5,366a
Pydrin 0.12 Ai/A-water	1.8a	4.2a	86.0	13.6a	11.5a	16.9a	5,182a
Pydrin 0.12 Ai/A-oil	4.2a	3.8a	87.0	13.2a	11.0a	16.8a	5,131a
Baythroid 0.025 Ai/A-water	2.6a	3.7a	88.0	13.4a	11.2a	16.6a	4,580a
Check	34.0b	29.6b	--	11.6b	9.8b	21.6b	3,744b

DMRT ($P<0.05$); * Check vs Treated - 26% loss ($P<0.03$) in CRS; Application dates: August 5, 26; Harvest: December 7-11; Infestation prior to 1st application was 8.3% with 9% of the plants showing at least one bored internode; Insecticide-water 2.0 GPA D8-45 nozzles, -oil 1 qt./A 8002E nozzles, -oil/water 1 GPA D8-45 nozzles.

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Ratoon Stunting Disease of Sugarcane

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Disease Surveys:

The development of alkaline-induced metaxylem autofluorescence (AIMA) has made it possible to detect ratoon stunting disease (RSD) from field samples. The technique is based on the response of the sugarcane metaxylem or water conducting vessel walls to the disease. When the basal internode of the plant is cut in cross section, treated with an alkaline solution, and viewed in a fluorescence microscope the metaxylem vessel walls appear red if diseased and are invisible if healthy. This technique has been confirmed by associating the presence of the fluorescence with the presence of the causal bacterium of RSD in the same samples.

Over the last several years samples from commercial fields (La. Agric. 27:6-7) and samples from variety release plots collected with the help of the Amerian Sugarcane League personnel have given some interesting results. It appears that the incidence of RSD is higher in the western than in the eastern area of the sugarcane belt. Studies will be continued this fall to sample the eastern and western sugarcane areas to confirm or deny the preliminary results which indicated an asymmetric distribution of RSD. If the higher incidence in the western area is confirmed testable hypotheses to account for the distribution will be advanced.

Recombinant DNA Biotechnology for RSD Detection:

A second approach to detecting and quantitating the causal bacterium of RSD, Clavibacter xyli subsp. xyli, was the focus of doctoral research by J. M. Kamso-Pratt. The technique of dot blot hybridization using radioactively labelled DNA of the cultured bacterium to detect the DNA of the bacterium in the diseased plant was developed. Dr. Pratt was able to detect hybridization of the DNAs using full strength diseased L 62-96 sap and dilutions of 1:2, 1:4, and 1:8 before losing the signal at 1:16. Each increasing dilution resulted in a smaller spot on the x-ray film. Comparison of spot sizes from dilutions of saps from different diseased varieties of sugarcane could be used to estimate the bacterial populations which each variety supports. Others have shown that yield losses to RSD are a varietal characteristic that are related to bacterial population size. The bigger the population the bigger the yield loss to RSD, the smaller the population the smaller the yield loss. This technique could be used to screen inoculated varieties in the breeding program for their RSD

tolerance or intolerance without having to do actual yield studies.

Water Flow Rates and Varietal Yield Response:

Others have proposed that varieties resistant or tolerant to RSD could be identified by the rates of water flowing through single node cuttings. Resistant healthy varieties were said to have low flow rates while susceptible varieties had high flow rates. Also, large decreases in flow rate between healthy and diseased cuttings of a single variety were said to indicate susceptible/intolerant varieties, while small decreases were said to be characteristic of resistant/tolerant varieties.

Frank Spooner, Jr. investigated the flow rates as predictors of varietal response to RSD for his masters research. The experiment involved evaluation of progeny of a cross between a resistant/low flow rate variety and a susceptible/high flow rate variety. The progeny were evaluated for RSD yield response and flow rates. Separation of the correlated phenomena was observed in the progeny suggesting that flow rates and yield response were not causally related and that flow rates were not good predictors of yield response to RSD in contrast to what others have indicated.

Conclusions:

The goal of my research continues to be understanding ratoon stunting disease of sugarcane. Only through understanding the disease which is acknowledged as the most damaging sugarcane disease in the world can we hope to bring it under control. Significant strides have been made in our ability to work with the disease through the development of the assays for detection described above.

Sugarcane Pathology Annual Report 1985

Jeff W. Hoy
Department of Plant Pathology and Crop Physiology

Smut Overwintering and Spread Study:

Smutted and healthy cane stools were mapped in portions of single plant cane fields of CP 65-357 and CP 74-383 during 1984 in an experiment conducted cooperatively with U.S. Sugarcane Field Laboratory scientists. During the 1985 growing season, previously smutted and healthy stools were checked for winter survival and the redevelopement of smut whips, and all new smut infections were counted and mapped. In addition, smut-infected and smut-free single stool plantings of CP 73-351 and CP 74-383 were established and monitored during first stubble in the same way.

Stools of all three varieties which were completely smutted as plant cane had significantly lower winter survival rates than healthy stools, and the number of whips reproduced in all previously smutted stools was very low for CP 65-357 and CP 74-383. There was also evidence that some surviving stools of both CP 65-357 and CP 74-383 recovered from smut infection in first stubble. The overall smut infection level, including all the whips resulting from new infections, was lower in first stubble than in plant cane for both CP 65-357 and CP 74-383. In contrast, a large increase in the number of smut whips produced was observed in first stubble stools of the highly susceptible variety CP 73-351.

Disease spread was monitored in the CP 65-357 and CP 74-383 fields by mapping all newly infected first stubble stools and determining their proximity to previously smutted stools. The spread of disease was very localized in both fields. Nearly all newly infected stools occurred within one yard of previously infected stools.

Portions of two plant cane fields of CP 65-357 and CP 74-383 were mapped during 1985 to repeat the overwintering and spread experiment under mild winter conditions.

Smut Resistance Studies:

Inoculation trials to evaluate variety candidate resistance levels to smut are conducted yearly as a part of the LSU, USDA and ASCL cooperative sugarcane breeding program. During 1985, 70 advanced variety candidates were evaluated by LSU personnel in a replicated test and 62 L and LCP 1983 series and 72 L and LCP 1984 series variety candidates were evaluated in an unreplicated screen for smut susceptibility. Twenty-two of 70 (31%) advanced candidates and 24 of 62 (39%) 1983 series candidates were dropped from the sugarcane breeding program because of high levels of susceptibility to smut detected in the trials. The test will be continued, and the remaining candidates will be evaluated in first stubble during 1986.

During the Fall of 1985, 66 advanced candidates, 42 L and LCP 1984 series and 84 L and LCP 1985 series variety candidates were inoculated with smut and planted at the LSU Citrus Branch Experiment Station in Plaquemines Parish. They will be evaluated for resistance to smut during the 1986 and 1987 growing seasons.

An experiment to study the inheritance of resistance to smut in Louisiana varieties was initiated during 1985. Nineteen crosses between resistant, moderately susceptible and susceptible parents were selected and all parents and 10 progeny of each cross were inoculated with smut and planted at the Citrus Branch Experiment Station. Smut infection levels will be determined for all plots and compared to estimate the heritability of resistance to smut, and the expression of resistance will also be studied in the different varieties. Additional greenhouse and field studies were conducted during 1985 and will be continued during 1986 to determine the different ways in which resistance to smut is expressed and their relative importance in Louisiana.

The timing of whip production was studied in the smut inoculation trial plots during 1985. The first smut whips were observed in most varieties during early May, and the peak of whip production occurred in June. However, new smut whips were still being produced until November.

Sugarcane Mosaic Research:

Mosaic infection levels were determined in advanced variety candidates at six LSU sugarcane breeding program test locations to get an estimate of varietal susceptibility to virus spread. In addition, mosaic infection levels were monitored in tissue culture derived Kleentek 65-357 planted in replicated yield tests at eight locations to determine how rapidly mosaic reinfection occurs in virus-free 65-357.

Soilborne Pathogen Research:

Techniques were worked out to demonstrate in controlled greenhouse experiments the ability of soilborne pathogens to damage the root system of sugarcane and cause reduced plant initial growth and regrowth rates. In pathogenicity tests, isolates of two species of Pythium, a soilborne fungus common in Louisiana sugarcane fields, were found to cause significant decreases in tiller number and top weight of regrowth of CP 70-321. Before cutting, root system damage consisted primarily of feeder root rotting with some main root rotting, but rotting of the main roots was more extensive in plants which had been topped to simulate harvest. In addition, root rot and resulting decreases in top growth were greater in tests conducted under cool growing conditions than in tests conducted under warm growing conditions. This research is being done in cooperation with Dr. R.W. Schneider, LSU Department of Plant Pathology and Crop Physiology.

Disease Interaction Study:

A field experiment was planted at the LSU St. Gabriel Branch Experiment Station to look at the single and combined effects of three diseases and three weed control programs on stubble crop yields. Plots of CP 70-321 and CP 70-330 were established with cane affected by mosaic, ratoon stunting disease, and Pythium root rot, and the CP 70-321 plots were divided into different weed control programs in a cooperative research project with Dr. Lynn Kitchen, LSU Department of Plant Pathology and Crop Physiology. The experiment will be allowed to run for up to six years in an attempt to determine which are the major factors contributing to sugarcane stubble decline.

The Genetic Stability of Somaclonal Variants Arising From Tissue Culture Propagated Sugarcane[1/]

Anthony G. Lourens and F. A. Martin

The potential of tissue culture as a means to rapidly propagate sugarcane planting materials free of major pathogens is complicated due to conflicting reports on the extent and degree of somaclonal variation associated with the cloning process. A study was conducted from 1982-1984 to assess the variability arising from in vitro regeneration and its vegetative transmission in two cultivars of Saccharum sp. (CP 65-357 and CP 72-356).

Tissue was either regenerated directly or maintained as callus for six weeks prior to plantlet regeneration. At maturity selected morphological characteristics of each cultivar were evaluated relative to the phenotype of the original cultivar.

The tissue culture process resulted in slightly increased morphological variability in plant cane in both cultivars. This variability was manifested primarily in the form of abnormal plant growth habit. However, a reversion to the original phenotype characteristic of the parental cultivars was evident in the second year of the experiment suggesting that the majority of the apparent variation from tissue culture was not under genetic control but was an expression of transient imbalances associated with the tissue culture process. Although much of the lack of conformity was reduced in the second year, only directly regenerated explant tissue was appropriate for cloning in CP 65-357, whereas CP 72-356 tissue maintained for up to 6-weeks as callus before regeneration was suitable.

These results demonstrate that to successfully clone and mass propagate specific sugarcane cultivars for use as planting materials, tissue culture technologies must be developed on a cultivar by cultivar basis.

[1/] This research was partially funded by Crop Genetics International, Dorsey, Maryland.

The Genetic Behavior of Response to Glyphosate as a Chemical Ripener in Four Crosses of Sugarcane 1/

K. A. Gravois and F. A. Martin
Agronomy Department

Increase in the yield of sucrose per acre has been accomplished in Louisiana by the development and wide acceptance of high sucrose cultivars. Efforts to further increase the sucrose content of sugarcane cultivars led to the discovery of synthetic chemical ripeners. However, research has shown a significant treatment by cultivar interaction to the application of ripeners.

To determine the feasibility of breeding and selecting for response to the plant growth regulator, glyphosate, a three year study (1980-1982) was conducted with the following objectives: (1) to determine phenotypic and genotypic correlations for sucrose content, stalk weight and sugar per stalk; (2) to estimate the broad sense heritability and repeatability of response to glyphosate.

The progenies of four crosses of sugarcane (Saccharum interspecific hybrids) were evaluated for changes in juice quality, stalk weight and sucrose per stalk after treatment with the chemical ripener glyphosate (1.0 lb. a.i./ha).

Response of the parental cultivars and experimental clones was calculated by taking the simple difference between the treated and untreated plots. These variables are referred to as response variables and are designated by "D".

The parents of the crosses chosen for this study exhibited a wide range of response to glyphosate. The range included two high responding cultivars CP 65-357 and CP 70-330, two moderate responding cultivars CP 75-360 and CP 66-346 and two nonresponding cultivars CP 67-412 and CP 72-355. Response groups are based on D-sucrose/stalk.

Evidence of the quantitative nature of response to glyphosate was seen by the occurrence of the experimental clones in a large number of continuously varying classes, with a tendency for the population to fit a normal curve.

In the evaluation of the genetic behavior of sugarcane in response to glyphosate, emphasis was placed on the response in sucrose/stalk. Here, both sucrose and stalk weight effects are represented. In a combined analysis of the four crosses, 6 of the 344 experimental clones had D-sucrose/stalk values which exceeded the parental values. Therefore, it is possible to select clones which exhibit both increases in sucrose content and either no change or an increase in stalk weight from large clonal populations.

Heritability estimates for the response variables were not significantly different from zero.

1/ This research was partially funded by a grant from the American Sugar Cane League.

It should be pointed out that 15 clones, or 4.3% of the progeny, exhibited a positive response to glyphosate over all three years. This indicates that it may be possible to choose individual clones which exhibit stability for response to glyphosate. Because of the large environmental influence upon response to glyphosate, evaluation of cultivars should begin in later selection stages. Evaluation of cultivars at several locations can increase precision to quantify this response. Effective evaluation could begin at "assignment" or in the "infield" stages of the Louisiana breeding programs. Likewise, those clones showing only marginal sucrose content could be advanced to further stages of testing if the cultivars have a consistent positive response to glyphosate.

Breeding for response to glyphosate does not seem feasible due to the low heritability. However, it is possible to select individuals that do respond.

Phenotypic and genotypic correlations were of similar magnitude, suggesting little environmental correlation. All were positive indicating a common genetic basis for response to glyphosate in the three traits studied.

Correlations between D-sucrose and stalk density, stalk fiber and stalk weight were 0.06, 0.07 and 0.05, respectively. All values were nonsignificant, therefore, selecting clones with acceptable stalk density, stalk fiber and stalk weight would be possible when obtaining clones that respond to glyphosate.

The data collected in this study suggest that because of the low heritability of response to glyphosate, breeding and subsequent selection would be inefficient. However, it is possible to choose individuals which exhibit stability for response to glyphosate. Therefore, this trait should hold little or no priority in crossing and should be evaluated at a later stage of variety testing. If possible, more than one location should be used to increase precision.

Predicting the Harvestability of Sugarcane Varieties in Louisiana[1/]

Edwis O. Dufrene and F. A. Martin
Agronomy Department

The adaptability of experimental sugarcane varieties to mechanical harvesting is of major concern to the Louisiana Sugarcane Variety Improvement Program. Louisiana sugarcane farmers will not accept a new sugarcane variety that cannot be handled mechanically.

In 1983, the hypothesis that adaptability of sugarcane varieties to mechanical harvesting is inversely associated to the percent stalks broken by a soldier type mechanical harvester was developed. To test this hypothesis, two separate studies were conducted.

In the first study, the percent broken stalks for nine varieties were determined at six outfield locations. There were significant differences between varieties in this study. Some varieties had a low number of broken stalks at all locations while some varieties had a high number of broken stalks at all locations. For example, CP 65-357, the variety most suited for mechanical harvesting, had the lowest percentage broken stalks at most locations. At the other extreme, L 75-2, an experimental variety which was not released as a commercial variety because of poor harvestability, had the highest percent broken stalks at two locations and the second highest percentage at the remaining locations. The variety CP 70-321 had the highest percent broken stalks at three of the six locations. Oddly enough, CP 70-321 performed fairly well at the two locations at which the cane in the test fields was erect. CP 72-356 had a high percentage of broken stalks at almost all locations. The results of this method closely match the industry's perception of how suited varieties are for mechanical harvesting.

A separate study was conducted to determine if plot size had an effect on the percent of stalks broken by a mechanical harvester. This study was conducted at the St. Gabriel Research Station and was repeated in the first stubble crop.

Again, there were differences between varieties. More importantly, there were no significant differences between the two plot sizes used. This suggests that predictions as to how a variety will react to mechanical harvesting can be made as early as the infield stage.

There are some limitations to this method, such as the time and labor involved. However, the information to be gained should be well worth the effort. This information would be useful in determining if varieties should be advanced to further stages of testing. The most important use of the data may be in the crossing program. If harvestability is a heritable trait then it should be considered at the time of crossing. The results of this study indicate that the suitability of a variety to mechanical harvesting can be predicted by estimating the percent stalks broken by a mechanical harvester.

[1/] This research was partially funded by a grant from the American Sugar Cane League.

Sucrose Lab Activities - 1985 Harvest Season

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During the 1985 harvest season, a total of 4,193 samples were run at the St. Gabriel Sucrose Lab. Of these samples, there were 4,066 sugarcane samples and 127 sorghum samples. For sugarcane sucrose analysis, 256 samples were run by the press analysis so that percent fiber could be determined. The remainder were run through the roller mill. Table 1 presents a breakdown on the sugarcane samples run and Table 2 gives a breakdown of the sorghum samples run for each project.

Table 1. Number of sugarcane samples run through the St. Gabriel Sucrose Lab during the 1985 harvest season.

Project	Number of Samples
Ag. Engineering	92
Agronomy Cultural Practices and Fertility	578
Variety Development and Testing	2675
Entomology	400
Plant Physiology	59
Weed Science	262
Total	4066

Table 2. Number of sorghum samples run through the St. Gabriel Sucrose Lab during the 1985 harvest season.

Project	Number of Samples
Agronomy	41
Entomology	86
Total	127

DATA MANAGEMENT FOR SUGARCANE BREEDING

Jack D. Berg and F. A. Martin
Agronomy Department

A data management system has been organized for the Louisiana Sugarcane Variety Improvement Program. A description of this system was presented at the American Society of Sugarcane Technologists meeting at Fort Walton, Florida. The software and documentation produced between 1983 and 1985 aids researchers in data entry and analysis specific to the LSU breeding program. Routines have been written for analysis using the Statistical Analysis System (SAS) on LSU's IBM mainframe through Time Sharing Option (TSO). The use of the System Productivity Facility (SPF) greatly enhances editing and utility functions. Documentation is available on line to answer questions about software without leaving the terminal.

The application of software is facilitated by organization which parallels stages in the breeding program. These stages include crossing, planting, selection, advancement, assignment and variety testing. Routines and documentation which are specified for each stage are identified by years from crossing.

Specific routines have been written to deal with data entry and retrieval. Pre-printed forms with concise information assist in planning photoperiod deployment, crossing strategies, and planting and potting schedules. Plot plans are used to generate field maps on which plots to be evaluated are identified. Maps can be updated as new data are entered. Filing routines take care of repetitive tasks in data entry. Computed or summarized data are stored for later use.

Software to assist in the annual production of special reports has been developed. An advancement summary is produced annually for the office report. Advancements from crossing through assignment are summarized by cross, by female parent and by male parent. Assignment means are generated from first and second line trial data. A collection of software to manage data on varieties in active testing (Active File) is another special section that has received much attention. These routines are used to maintain past records and add new data. All data are summarized for varieties active in replicated trials and reported as compared to commercial checks. The Variety Advancement Committee uses the final report of the Active File annually to decide which of the experimental varieties will remain in active testing.

Documents for instructional purposes have been written and most programs are documented internally. Data management system aids developed include data entry logs, computer task check lists, and filing instructions. New programming needs are identified and solutions developed continuously. Maintenance of software and updating of documentation is crucial to the performance of the data management system.

The move into the new Agronomy building was accompanied by the acquisition of an IBM Personal Computer XT with a hard disk drive and 640 K of memory. The Sugar Station purchased an IBM PC with 256 K of memory. This equipment was put to immediate use in the development of software in BASIC to aid in selecting crosses based on parental characters. Also, the word

processing capabilities of the PC have facilitated the production of documentation for the sugarcane data management system. The value of the computers will be greatly enhanced by the implementation of communication facilities with the LSU mainframe and also by the acquisition of SAS software for microcomputers.

A workshop was held on January 16, 1986 to bring all members of the sugarcane breeding group up to date on data management procedures. Current procedures were discussed, as well as mainframe users techniques and the future impact of microcomputers.

1985 Crossing Campaign

Joey P. Quebedeaux and F. A. Martin
Agronomy Department

One hundred, seventy-four varieties of sugarcane were used in the 1985 crossing campaign. There were 19 "L" varieties, 73 "LCP" varieties, 70 "CP" varieties selected for Louisiana, 8 "CP" varieties selected for Florida, and 4 "US" varieties. Seventy-one varieties were of unknown photoperiod response and 103 were of known response.

The 71 varieties of unknown photoperiod response along with 25 selected varieties of known response were placed on the greenhouse rail system for natural induction. By comparing the date of flowering of these newer varieties to the date of flowering of the older varieties, a first approximation of the photoperiod response of the new varieties can be made. The pollen producing capacity of each new variety that flowers following natural induction was also estimated. All experimental crosses produced with these new varieties are available to the variety selection phase of the program.

A photoperiod experiment was begun in 1985 in which 12 varieties of known photoperiod response were subjected to 3 photoperiod regimes. Three of the 6 available photoperiod bays were used for the experiment and each bay contained identical material. The varieties in each bay were divided into 3 categories of ease of flower induction: hard, moderate and easy. Each category was placed on 1 of the 3 rail carts assigned to each bay.

Sunlight was used as the light source for the 1985 photoperiod treatments. The doors of the photoperiod bays were opened at the prescribed time to start the photoperiod treatments and the carts were pulled from the photoperiod houses. The natural sunset terminated the daily photoperiod treatments and the carts were pushed into the photoperiod houses after sunset. From the hard to easy category in the experiment, the number of constant photoperiods (induction cycles) were 40, 25 and 10 days of 12 hours and 30 minutes. The constant photoperiod for each category was programmed to be completed on July 12.

The decreasing of the photoperiod for the 3 bays commended on July 12. Each bay received a different rate of declining daylength. The 3 rates were: a decrease of ½ minute per day, a decrease of 1 minute per day and a 30 day progressive rate of decrease after which the rate was held to 1 minute per day. On September 11, the photoperiod treatments were stopped and the canes were again subjected to natural photoperiod. Data collected from the experiment consisted of date of tassel emergence, date tassel began to dehisce, and a pollen production rating.

The remaining photoperiod bays were used for the production of true seed for the 1985 crossing campaign. Seventy-nine varieties of known photoperiod response were placed on 9 rail carts according to their ease of photoperiod flower induction. From the most difficult category to the easiest, the number of constant photoperiods (induction cycles) were 40, 40, 33, 28, 25, 25, 19, 14 and 10 days of 12 hours and 30 minutes. The constant photoperiod for these bays was also programmed to be completed on July 12.

The decrease in photoperiod began on July 12 and there was a progression in the rate of decrease until August 10, after which the rate was held at 1 minute per day until September 11. The canes were then subjected to natural photoperiod again. All plants designated for pollen production were protected when night temperatures fell below 70°F.

All stalks on the photoperiod system were air layered during the week of August 26. The first cross was made on September 19. The synchronization of tasseling was excellent and for all practical purposes, flowering on the photoperiod carts was completed by late October.

The first cross from the greenhouses rail system was made on November 27 and flowering of the material on this system continued until the beginning of January. At the end of the crossing campaign all varieties that had not flowered were observed to determine if induction had taken place.

Two hundred, eighty-six crosses were made with the material induced to flower via the controlled photoperiod. Fifty-one crosses were made with the material from the greenhouse rail system. Tables 1 and 2 give a summary of the 1985 crossing campaign. Table 3 shows the flowering response to artificial photoperiod of the varieties used in the 1985 crossing campaign.

In an effort to solve the problem of low relative humidity in the crossing greenhouse, a humidistat-controlled misting system was installed after the crossing campaign began. Germination tests showed a large increase in seed set in the crosses made after the installment of the misting system. By correcting the problem of low relative humidity in the crossing greenhouse, a new record was set in the LSU sugarcane breeding program with the production of 689,154 estimated viable seed during the 1985 crossing campaign.

Table 1. Summary of the 1985 crossing campaign.

Type of cross	No of crosses	No. of seedlings
Biparental	284	640,717
Polycross	11	20,134
Self	42	28,303
Total	337	689,154

Table 2. Summary of crosses made in the LSU crossing program in 1985.

Female Parent	# of Tassels	Male Parent	# of Tassels	Frequency of Cross	Estimated # of Viable Seed
CP48-103	2	CP57-614	7	1	124
CP48-103	1	CP69-1052	5	1	2117
CP48-103	2	CP70-321	10	1	580
CP48-103	2	CP76-331	9	1	506
CP48-103	5	L78-063	4	1	528
CP48-103	1	LCP81-030	6	1	1022
CP52-068	2	CP75-308	2	1	1679
CP52-068	1	CP80-360	1	1	350
CP52-068	1	L75-056	3	1	192
CP52-068	1	L78-063	1	1	1285
CP52-068	3	LCP81-030	5	1	1718
CP57-614	1	Self	.	1	483
CP61-037	2	CP57-614	1	1	940
CP61-037	3	CP70-321	10	1	749
CP61-037	1	CP72-1312	2	1	683
CP61-037	5	CP73-351	30	2	3184
CP61-037	5	CP76-301	7	2	3353
CP62-258	1	Self	.	1	2100
CP65-357	3	CP62-258	8	1	6734
CP65-357	2	CP67-412	6	1	3634
CP65-357	3	CP69-1052	5	1	2297
CP65-357	3	CP69-373	4	1	3121
CP65-357	2	CP70-321	5	1	906
CP65-357	2	CP72-2086	7	1	3690
CP65-357	3	L78-063	4	1	146
CP65-357	8	LCP81-030	18	3	5771
CP65-357	1	US77-10	1	1	106
CP66-346	3	85P2	.	1	6218
CP67-412	1	Self	.	1	1469
CP69-1052	1	Self	.	1	2705
CP69-373	1	85P2	.	1	724
CP70-300	2	CP67-412	6	1	2022
CP70-300	3	CP72-355	9	1	225
CP70-321	1	CP66-346	2	1	1164
CP70-321	1	CP67-412	4	1	459
CP70-321	2	Self	3	2	5474
CP70-321	1	CP72-355	5	1	508
CP70-321	3	CP73-351	24	2	1207
CP70-321	1	CP80-323	4	1	336
CP70-330	2	CP66-346	1	1	5624
CP70-330	3	CP67-412	6	1	2884
CP70-330	2	CP69-1052	5	1	3853
CP70-330	2	CP72-355	10	1	401
CP70-330	2	CP73-351	13	1	241
CP70-330	2	CP76-301	4	1	4250
CP70-330	2	CP76-331	9	1	231
CP70-330	2	CP77-407	4	1	3680
CP70-330	1	CP80-323	4	1	3172
CP70-330	1	L75-002	2	1	2519
CP70-330	2	LCP81-030	10	1	4278

Table 2. Continued

Female Parent	# of Tassels	Male Parent	# of Tassels	Frequency of Cross	Estimated # of Viable Seed
CP70-330	2	LCP82-089	12	2	5259
CP71-357	1	CP67-412	2	1	1380
CP71-357	1	CP80-323	2	1	4026
CP71-441	1	CP70-321	7	1	1436
CP71-441	1	CP76-301	2	1	4094
CP71-459	2	CP69-373	4	1	1728
CP71-459	2	CP72-2086	7	1	3408
CP72-1210	2	CP70-321	10	1	347
CP72-1210	2	CP73-351	11	1	1898
CP72-1312	1	Self	.	1	845
CP72-1312	1	CP72-355	10	1	995
CP72-2086	1	Self	.	1	714
CP72-355	1	Self	.	1	1080
CP72-356	2	CP57-614	7	1	76
CP72-356	1	CP73-351	13	1	89
CP72-370	1	CP67-412	4	1	798
CP72-370	2	CP70-321	5	1	224
CP72-370	2	CP73-351	13	1	1056
CP72-370	2	CP76-331	9	1	82
CP72-370	1	LCP81-030	10	1	1806
CP73-345	1	CP73-351	17	1	576
CP73-345	2	CP75-308	2	1	81
CP73-345	3	CP76-331	9	1	260
CP73-345	1	CP77-402	6	1	118
CP73-345	2	CP78-304	5	1	1142
CP73-345	1	LCP81-030	3	1	601
CP73-351	1	Self	.	1	119
CP74-2013	1	Self	.	1	551
CP74-383	2	CP57-614	7	1	338
CP74-383	3	CP67-412	3	1	97
CP74-383	2	CP69-373	4	1	2483
CP74-383	3	CP70-321	10	1	233
CP74-383	2	CP72-355	10	1	536
CP74-383	1	CP73-351	17	1	1638
CP74-383	3	CP74-2013	5	1	2400
CP74-383	2	CP77-402	2	1	68
CP74-383	2	CP80-323	7	1	162
CP74-383	1	CP80-360	1	1	172
CP74-383	3	LCP81-030	5	1	641
CP74-383	1	LCP82-076	2	1	403
CP74-383	1	LCP83-152	4	1	156
CP75-1091	1	CP78-304	4	1	350
CP75-308	3	CP67-412	3	1	512
CP75-308	1	CP69-1052	5	1	5975
CP75-308	1	CP70-321	9	1	1694
CP75-308	2	CP72-2086	7	1	2886
CP75-308	1	Self	.	1	1095
CP75-308	1	CP77-310	2	1	989
CP76-301	1	85P2	.	1	4409
CP76-301	1	Self	.	1	708
CP76-331	1	85P2	.	1	1080

Table 2. Continued

Female Parent	# of Tassels	Male Parent	# of Tassels	Frequency of Cross	Estimated # of Viable Seed
CP76-331	1	Self	.	1	865
CP77-310	1	Self	.	1	249
CP77-310	1	LCP82-076	2	1	3729
CP77-401	1	CP70-321	9	1	187
CP77-401	1	CP72-2086	7	1	104
CP77-402	1	Self	.	1	364
CP77-405	2	CP72-355	8	1	6880
CP77-405	2	LCP81-030	6	1	4278
CP77-407	2	85P2	.	1	3791
CP77-407	1	Self	.	1	415
CP77-413	2	85P1	.	1	4189
CP77-414	1	CP67-412	6	1	1095
CP77-414	1	CP70-321	4	1	1448
CP77-414	1	CP80-323	7	1	969
CP77-414	2	LCP81-026	1	1	226
CP77-414	3	LCP81-030	8	1	1505
CP77-416	1	CP66-346	2	1	194
CP77-416	1	CP70-321	7	1	60
CP77-416	1	CP76-301	2	1	804
CP77-416	1	LCP81-030	10	1	84
CP78-304	1	Self	.	1	1748
CP78-317	2	CP62-258	8	1	3832
CP78-317	3	CP70-321	3	1	62
CP78-317	5	CP72-355	15	2	2242
CP78-317	2	CP80-323	7	1	285
CP78-317	3	L75-056	3	1	54
CP78-317	2	LCP81-030	9	1	139
CP78-357	2	CP73-351	17	1	4950
CP78-357	1	CP76-331	8	1	464
CP78-357	4	LCP81-030	18	2	7238
CP79-300	2	LCP83-152	4	1	452
CP79-318	2	CP69-1052	5	1	17460
CP79-318	3	CP70-321	7	1	7112
CP79-318	1	CP72-1312	2	1	4423
CP79-318	4	CP73-351	17	1	9880
CP79-318	2	CP76-301	3	1	8044
CP79-318	2	CP80-313	2	1	7590
CP79-318	3	LCP81-030	6	1	9105
CP79-318	2	LCP82-089	6	1	8187
CP79-332	2	CP62-258	8	1	8364
CP79-332	2	CP66-346	2	1	2312
CP79-332	1	CP69-1052	2	1	2640
CP79-332	2	CP70-321	7	1	2013
CP79-332	2	CP72-355	8	1	2948
CP79-332	2	CP73-351	18	2	2538
CP79-332	2	CP76-331	2	1	3300
CP79-332	2	LCP81-030	3	1	8821
CP79-348	1	CP69-373	4	1	952
CP79-348	2	CP72-355	10	1	416
CP79-348	3	CP76-331	9	1	5753
CP79-348	1	L83-183	2	1	336

Table 2. Continued

Female Parent	# of Tassels	Male Parent	# of Tassels	Frequency of Cross	Estimated # of Viable Seed
CP79-348	2	LCP81-030	9	1	1135
CP79-348	1	LCP82-076	2	1	86
CP79-348	2	LCP83-172	1	1	1469
CP79-348	1	LCP83-198	3	1	420
CP80-313	2	CP69-373	4	1	5560
CP80-313	2	CP70-321	10	1	332
CP80-313	4	CP72-355	14	2	3436
CP80-313	2	CP75-308	2	1	5105
CP80-313	2	CP80-323	7	1	785
CP80-313	1	CP80-352	4	1	188
CP80-313	3	LCP81-030	12	2	1991
CP80-319	1	CP69-1052	5	1	2182
CP80-319	1	CP76-301	4	1	661
CP80-319	2	CP77-310	1	1	2908
CP80-319	1	LCP81-030	10	1	504
CP80-323	5	85P2	.	1	5715
CP80-323	1	CP73-351	4	1	6225
CP80-323	1	Self	.	1	202
CP80-323	1	US77-10	1	1	110
CP80-324	2	CP77-310	2	1	1550
CP80-324	4	LCP81-030	14	2	1507
CP80-328	1	CP67-412	2	1	189
CP80-328	3	CP70-321	16	2	5120
CP80-328	2	CP72-355	8	1	2158
CP80-328	1	CP76-301	4	1	600
CP80-328	1	CP76-331	2	1	869
CP80-328	2	LCP81-030	6	1	3648
CP80-351	1	CP66-346	1	1	2251
CP80-351	1	CP74-2013	1	1	3760
CP80-351	1	CP76-301	2	1	4968
CP80-351	2	LCP81-030	3	1	2548
CP80-352	2	CP70-321	10	1	2795
CP80-352	2	CP73-351	11	1	4524
CP80-352	1	CP76-301	3	1	1666
CP80-352	2	CP77-310	2	1	2360
CP80-356	2	CP62-258	8	1	5011
CP80-356	2	CP66-346	2	1	6058
CP80-356	2	CP67-412	2	1	8908
CP80-356	2	CP69-1052	5	1	14232
CP80-356	2	CP70-321	9	1	4186
CP80-356	2	CP72-1312	2	1	7590
CP80-356	2	CP73-351	13	1	638
CP80-356	1	CP74-2013	1	1	5692
CP80-356	2	L75-002	2	1	7969
CP80-356	2	LCP81-030	9	1	1021
CP80-356	1	LCP82-089	6	1	9408
CP80-360	1	CP76-331	2	1	355
CP80-360	1	LCP81-030	1	1	607
CP81-307	5	85P1	.	1	3702
CP81-307	1	CP57-614	7	1	1986
CP81-307	3	CP74-2013	5	1	6076

Table 2. Continued

Female Parent	# of Tassels	Male Parent	# of Tassels	Frequency of Cross	Estimated # of Viable Seed
CP81-311	2	L83-194	3	1	1602
CP81-316	2	CP80-323	6	1	466
CP81-325	1	CP78-304	4	1	233
CP82-528	1	L78-063	1	1	570
CP82-530	2	CP67-412	4	1	231
CP82-559	2	LCP83-198	3	1	570
L65-069	1	CP57-614	1	1	2352
L65-069	1	CP67-412	3	1	1642
L65-069	2	CP76-301	3	1	4898
L75-002	7	85P2	.	1	17898
L75-002	1	Self	.	1	86
L75-005	3	85P1	.	1	242
L78-063	4	85P2	.	1	13350
L79-034	2	CP72-355	8	1	2300
L79-034	2	L82-107	3	1	2128
L80-035	3	LCP81-030	8	1	6669
L82-107	1	CP69-373	4	1	4007
L82-107	1	Self	.	1	2048
L83-175	1	Self	.	1	104
L83-194	1	Self	.	1	240
L86-391	2	LCP81-030	6	1	2982
LCP81-005	2	CP62-258	8	1	3330
LCP81-005	2	CP73-351	11	1	2626
LCP81-005	1	CP76-331	8	1	306
LCP81-005	3	LCP81-030	6	1	2864
LCP81-009	1	CP70-321	3	1	1584
LCP81-009	1	LCP81-030	3	1	924
LCP81-010	2	LCP83-133	4	1	1133
LCP81-012	2	CP73-351	18	2	1142
LCP81-012	1	LCP81-030	10	1	1632
LCP81-018	1	CP67-412	4	1	1017
LCP81-018	2	CP70-321	7	2	6057
LCP81-018	2	CP76-331	1	1	2167
LCP81-023	1	CP70-321	9	1	2142
LCP81-023	2	CP76-331	8	1	185
LCP81-026	1	Self	.	1	136
LCP81-030	1	Self	.	1	300
LCP82-033	1	CP67-412	2	1	770
LCP82-033	2	CP72-355	8	1	4740
LCP82-033	2	CP76-301	3	1	2689
LCP82-033	2	CP77-310	1	1	2802
LCP82-033	1	LCP81-030	3	1	1450
LCP82-045	2	CP80-313	2	1	5161
LCP82-045	1	LCP81-030	10	1	1242
LCP82-046	2	CP72-355	8	1	2675
LCP82-046	2	LCP81-030	8	1	4407
LCP82-047	2	CP69-1052	5	1	11954
LCP82-047	2	CP70-321	3	1	7636
LCP82-047	4	LCP81-030	19	3	12245
LCP82-057	2	CP67-412	2	1	8756
LCP82-057	2	CP70-321	4	1	4626

Table 2. Continued

Female Parent	# of Tassels	Male Parent	# of Tassels	Frequency of Cross	Estimated # of Viable Seed
LCP82-058	2	CP69-1052	2	1	1285
LCP82-058	1	CP70-321	7	1	458
LCP82-058	3	CP76-331	2	1	1800
LCP82-064	1	CP70-321	4	1	581
LCP82-064	2	CP76-301	6	2	1398
LCP82-064	2	LCP81-030	10	1	734
LCP82-073	1	CP72-355	8	1	648
LCP82-073	1	LCP81-030	8	1	1117
LCP82-076	2	LCP81-030	16	2	1714
LCP82-089	1	CP67-412	2	1	1267
LCP82-089	1	Self	.	1	4129
LCP82-097	1	CP70-321	10	1	279
LCP82-097	2	CP72-2086	7	1	2269
LCP82-097	2	LCP81-030	8	1	1286
LCP83-124	1	CP67-412	1	1	195
LCP83-127	2	CP76-331	4	1	89
LCP83-129	2	LCP81-030	2	1	883
LCP83-152	1	LCP83-198	3	1	162
LCP83-154	1	LCP81-030	2	1	321
LCP83-161	2	CP67-412	4	1	235
LCP83-163	2	CP77-402	2	1	2352
US74-90	2	CP70-321	7	1	1016
US74-90	2	CP73-351	17	1	3331
US77-1	3	CP70-321	17	2	286
US77-17	2	CP70-321	17	2	1112
US77-17	1	CP75-308	2	1	144
US77-17	2	LCP81-030	10	1	2940
	515		1525	303	688873

Crosses with less than 50 viable seed not included.

Polycrosses are designated 85P-#.

Table 3. Photoperiodic ease of flowering of varieties used in the 1985 crossing campaign.

[1]

Flowering class								
1	2	3	4	5	6	7	8	9
CP52-068	CP69-373	CP48-103	CP67-412	CP65-357	CP61-037	CP72-2086	CP76-301	CP69-1052
CP57-614	CP71-459	CP62-258	CP70-300	CP72-1210	CP73-351	CP75-308		CP71-357
CP74-383	CP74-2013	CP66-346	CP70-321	CP72-356	CP78-304	CP79-332		CP71-441
CP77-310	CP77-401	CP76-331	CP70-330	CP77-413	LCP82-047	LCP82-073		CP77-416
	CP77-407	CP78-317	CP72-1312	CP77-414	US77-1			CP79-300
	CP80-352	CP79-348	CP72-355	CP78-357				CP80-319
	CP81-307	CP80-356	CP72-370	CP80-313				CP80-351
	LCP82-046	CP81-316	CP73-345	CP80-323				L75-002
		L80-035	CP77-402	CP80-324				L79-034
		LCP81-023	CP77-405	L65-069				LCP81-012
			CP79-318	L86-391				LCP82-057
			CP80-328	LCP81-005				LCP82-058
			L75-056	LCP81-009				LCP82-064
			L78-063	LCP81-018				
			L82-107	LCP81-026				
			LCP81-030	LCP82-097				
			LCP82-033	US77-10				
			LCP82-045					
			LCP82-076					
			LCP82-089					
			US74-90					
			US77-17					

[1] Flowering class is based on number of days to first flower after photoperiod is initiated:

1 < 90 days
2 90 to 94 days
3 95 to 99 days
4 100 to 104 days
5 105 to 109 days
6 110 to 114 days
7 115 to 119 days
8 120 to 124 days
9 >124 days

Selection, Line Trials and Assignments for the Year 1985

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At one point during 1985, there were 113,420 possible new sugarcane varieties in the seedling through assignment phases of the LSU Sugarcane Variety Improvement Program. Through selection and line trial evaluations, this number was reduced to 76,002 by the end of the season. A summary of the selections, advancements and assignments made during 1985 is presented in Table 1.

In February of 1985, 84,000 seedlings representing 181 crosses, were potted and placed in the greenhouse. Seventy-six thousand seedlings were from crosses made at LSU during the 1984 crossing season; 3,328 came from 1983 LSU crosses; 5,000 were from the basic crossing program at the USDA in Houma. In April, 77,127 seedlings were transplanted to the field; 70,764 survived the operation.

In April of 1984, 67,167 seedlings from the 1983 crossing series were transplanted to the field. A sizable percentage of these seedlings did not survive the freeze of January 1985. Only 37,967 were available for selection in September 1985 as stubble single stools. Of these, 3,810, or about 10%, were selected and planted in six-foot first line trial plots. Those clones advanced, met or exceeded minimum standards for growth habit, stalk number, stalk diameter, stalk height, brix (by hand refractometer) and absence of pith and/or tube.

Of the 3,397 first line trial clones, representing the 1982 crossing series, 1,136 or 33.4%, were advanced to sixteen-foot second line trial plots. This percentage is somewhat higher than normal due to the problems posed by hurricane Juan. Because of severe lodging and entanglement of the stalks caused by the storm, normal selection pressures could not be applied. Advancement of clones to second line trials was based on summer ratings and the absence of pith/tube. None of the other selection criteria previously mentioned could be applied. A six stalk sample would usually be cut from the plots of those clones being advanced in order to obtain mean stalk weight and sucrose data. In 1985, this was not possible because of the storm.

Nine hundred thirty-eight clones in second line trial plant cane plots of the 1981 crossing series were rated and evaluated for agronomic traits. Based on these evaluations and the previous year's sucrose analysis, 209 clones were planted in fifteen-foot increase plots and will be considered for assignment in 1986. Six-stalk samples were taken from the second line trial plant cane plot and the first line trial stubble plot for each of these clones. Mean stalk weight and sucrose data (via mill extraction) were taken on each sample.

Three hundred fifty four clones of the 1980 crossing series in second line trial stubble plots were considered for assignment in 1985. Based on ratings, stalk counts and four line trial sucrose analyses, the number of candidates was reduced to the final 83 varieties which were assigned permanent 1985 numbers (Table 2). Four were from the LSU crossing program and were assigned "L85" variety numbers; the remaining 79 were progenies of USDA crosses and were assigned "LCP85" numbers. After assignment, a six-stalk sample was used for fiber analysis via the chip-press method.

Table 1. Summary of selections, advancements and assignments made during 1985 by the LSU Sugarcane Variety Improvement Program.

Crossing series	Number of crosses	Seedlings potted	Seedlings to field	Survived trans-planting	Available for selection	Advanced to First lines	Advanced to Second lines	Candidates for assignment	Assigned in 1985
80	135		73,860	60,891	47,944	8,353	829	354	83[1/3/]
81	150	76,766	68,756	62,803	48,628	5,029	938[2/]	209[1/3/]	
82	99	76,928	66,651	45,714	25,357	3,397[2/]	1,136[1/3/]		
83	194	80,000	67,167	54,756	37,967[2/]	3,810[1/3/]			
84	181	84,000[1/]	77,127[1/]	70,764[2/3/]					

[1/] Work done in 1985.

[2/] Number of possible new varieties in field at the beginning of the 1985 season.

[3/] Number of possible new varieties following selection, line trial evaluation and assignment.

Table 2. Summary of the data on the varieties assigned permanent "L" and "LCP" numbers in 1985.

VARIETY[1]	PARENTS	SUGAR[2] PER ACRE	SUGAR[3] PER TON	TONS CANE[2] PER ACRE
CP61-037		5247	166	31.9
CP65-357		6394	227	27.4
CP70-321		6004	215	27.4
CP74-383		8436	207	39.9
LCP85-293	CP75-361 x CP72-355	8218	202	39.8
L85-294	CP64-388 x L62-086	11184	228	45.8
LCP85-295	CP72-370 x CP70-401	8501	224	37.1
LCP85-296	CP65-357 x CP77-413	9537	205	43.5
LCP85-297	CP77-310 x CP77-407	10988	205	52.2
LCP85-298	CP77-310 x CP77-407	9808	225	44.2
LCP85-299	CP74-383 x CP77-407	9732	236	39.3
LCP85-300	CP61-039 x CP67-412	12701	206	59.3
LCP85-301	CP72-355 x CP67-412	7914	189	45.9
LCP85-302	CP77-310 x CP77-407	9745	244	40.8
LCP85-303	CP74-383 x CP77-407	11066	234	45.5
LCP85-305	CP74-383 x CP77-407	9896	229	42.2
LCP85-306	CP74-387 x CP77-414	8928	219	40.5
LCP85-307	CL61-005 x CP70-330	8217	251	32.6
LCP85-308	CL61-005 x CP70-330	9238	242	37.5
LCP85-309	CP74-387 x CP77-414	8048	215	36.0
LCP85-310	CP75-330 x CP77-413	9498	212	44.1
LCP85-311	CP66-346 x CP73-351	10142	211	44.7
LCP85-312	CP75-330 x CP77-413	8667	222	39.2
LCP85-313	CP77-414 x CP67-412	8373	214	40.7
LCP85-314	CP72-356 x CP77-418	9106	228	38.9
LCP85-315	CP74-383 x CP72-355	8960	204	41.6
LCP85-316	MISC.	9834	226	40.0
LCP85-317	CP76-340 x CP66-346	8315	208	39.5
LCP85-319	CP65-357 x CP77-413	8654	212	40.7
LCP85-320	CP74-387 x CP77-407	7916	234	34.9
LCP85-322	CP72-370 x CP73-351	8195	231	36.2
LCP85-324	CP65-357 x CP77-413	9164	219	43.2
LCP85-326	CP65-357 x CP77-413	7879	195	40.1
L85-327	CP66-315 x CP66-315	12704	218	57.5
LCP85-328	CP77-413 x CP75-361	10859	230	45.4
LCP85-329	CP65-357 x CP77-413	8761	232	39.3
LCP85-333	CP65-357 x CP77-413	10945	224	49.0
L85-334	CP66-315 x L66-098	9127	248	36.5
LCP85-335	CP65-357 x CP77-413	9910	218	45.4
LCP85-336	CL65-279 x CP77-413	13252	210	63.2
LCP85-337	CL65-279 x CP77-413	14912	223	62.3
LCP85-338	CP77-422 x POLY	9833	225	44.0
LCP85-339	CP74-383 x CP74-322	8926	238	38.6
LCP85-340	CP74-383 x CP74-322	10918	225	51.0
LCP85-341	CP74-383 x CP74-322	8887	222	40.0
LCP85-342	CP77-422 x POLY	8514	217	38.8

(continued)

VARIETY[1]	PARENTS	SUGAR[2] PER ACRE	SUGAR[3] PER TON	TONS CANE[2] PER ACRE
LCP85-343	CP74-322 x CP77-418	9520	215	44.1
LCP85-344	CP77-403 x POLY	8282	208	40.6
LCP85-345	CP74-387 x CP77-407	9066	194	48.1
LCP85-346	CP75-324 x POLY	10649	227	46.2
LCP85-347	CP77-310 x CP77-407	8645	222	39.6
LCP85-349	CP75-324 x POLY	9930	213	46.2
LCP85-350	CP75-324 x POLY	8562	229	37.0
LCP85-352	CP77-310 x CP77-407	9350	218	41.4
L85-353	CP65-392 x CP68-350	8178	226	38.3
LCP85-354	CP76-340 x CP77-418	11046	228	48.9
LCP85-355	CP74-387 x POLY	8091	217	37.8
LCP85-358	CP77-310 x CP77-403	11960	235	49.4
LCP85-359	CP77-310 x CP77-407	8484	246	34.0
LCP85-360	CP74-387 x POLY	10018	238	42.1
LCP85-361	CP74-387 x POLY	9719	231	43.1
LCP85-362	CP76-340 x CP77-407	10221	234	42.3
LCP85-363	CP65-357 x CP72-355	8356	227	35.4
LCP85-364	CP74-387 x CP77-418	9424	209	44.7
LCP85-365	CP65-357 x CP72-355	12024	235	50.4
LCP85-366	CP74-387 x POLY	7913	226	35.0
LCP85-367	CP76-340 x CP77-407	9507	229	41.1
LCP85-368	CP77-310 x CP77-414	6490	220	30.1
LCP85-369	CP74-387 x POLY	8456	224	38.9
LCP85-371	CP77-310 x CP77-407	7863	231	33.5
LCP85-372	CP74-383 x CP77-310	9519	235	39.7
LCP85-373	CP76-340 x CP73-308	10068	211	45.6
LCP85-374	CP76-340 x CP73-308	7746	208	40.4
LCP85-375	CP77-422 x POLY	8860	213	38.7
LCP85-376	CP77-403 x POLY	9819	232	45.2
LCP85-377	CP74-387 x CP77-418	7168	220	33.5
LCP85-378	CP77-417 x CP76-351	8262	233	34.0
LCP85-379	CP77-310 x CP77-418	8014	200	42.4
LCP85-380	CP74-383 x CP77-310	7719	208	35.0
LCP85-381	CP76-340 x CP73-308	9693	236	40.4
LCP85-382	CP74-322 x CP72-355	10376	228	43.3
LCP85-384	CP77-310 x CP77-407	8065	231	35.7
LCP85-385	CP77-407 x CP67-412	9894	224	42.5
LCP85-386	CP76-340 x CP77-407	7660	229	34.6
LCP85-397	CP74-387 x POLY	9136	231	40.2
LCP85-388	CP77-407 x CP67-412	9020	228	40.1
LCP85-389	CP77-310 x CP77-403	7219	253	29.3
LCP85-390	CP77-310 x CP77-407	9386	250	37.9

[1] "L" prefix denotes progenies of crosses made and selected at LSU. "LCP" prefix denotes progenies of crosses, made at Canal Point, Fla., but selected at LSU.

[2] Mean of two samples taken from plant cane second line trials in 1984 and first stubble second line trials in 1985.

[3] Mean of four samples taken from plant cane and first stubble of first line trials in 1983 and 1984, respectively; and plant cane and first stubble second line trials in 1984 and 1985, respectively.

Results of Infield Variety Trials at St. Gabriel Research Station During 1985

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and

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St. Gabriel Research Station

Experimental varieties are planted in infield variety trials from the time they are assigned a permanent number until they are planted in replicated yield trials at outfield testing locations. At the St. Gabriel Station, these trials are conducted on a Commerce silt loam soil (southwest side of highway 30) and a Sharkey clay soil (northeast side of highway 30). Normal cultivation practices are used in the infield tests.

In 1985, rows were off-barred and a pre-emergence herbicide was applied in the latter part of February. Nitrogen and potash were applied in mid-April. Fields were laid-by and a pre-emergence herbicide was applied in June.

The climatic data from St. Gabriel for 1985 are presented in Table 1 and Figure 1. The data consist of the daily minimum and maximum temperatures and rainfall. Severe freezes occurred on January 20 and 21, with temperatures dropping into the low teens. The station also felt the effects of three hurricanes in 1985. Hurricanes Danny and Elena hit in August and caused some lodging. However, much of the cane was able to right itself before the harvest season began. In late October, Hurricane Juan caused considerable damage to the crop and presented problems in the harvesting of plots.

Six infield tests were planted at the St. Gabriel Research Station in 1985 (Table 2). These tests used experimental varieties from the 1982 assignment series through the 1985 assignment series. Check varieties used were CP 65-357, CP 70-321, and CP 74-383.

Sixteen infield tests were harvested at St. Gabriel in 1985. Each test contained at least three commercial varieties. Standard varieties used were CP 65-357, CP 70-321 and CP 74-383. All tests were cut with a mechanical harvester. Plots were weighed with a tractor-mounted hydraulic weigh rig. A ten stalk sample was pulled from each plot and sent to the St. Gabriel sucrose lab for juice analysis. Data from each infield test can be found in Tables 3 through 18. The mean separations used (LSD and HSD) are protected.

Figure 1. Climatic data from St. Gabriel, Louisiana for the year 1985.

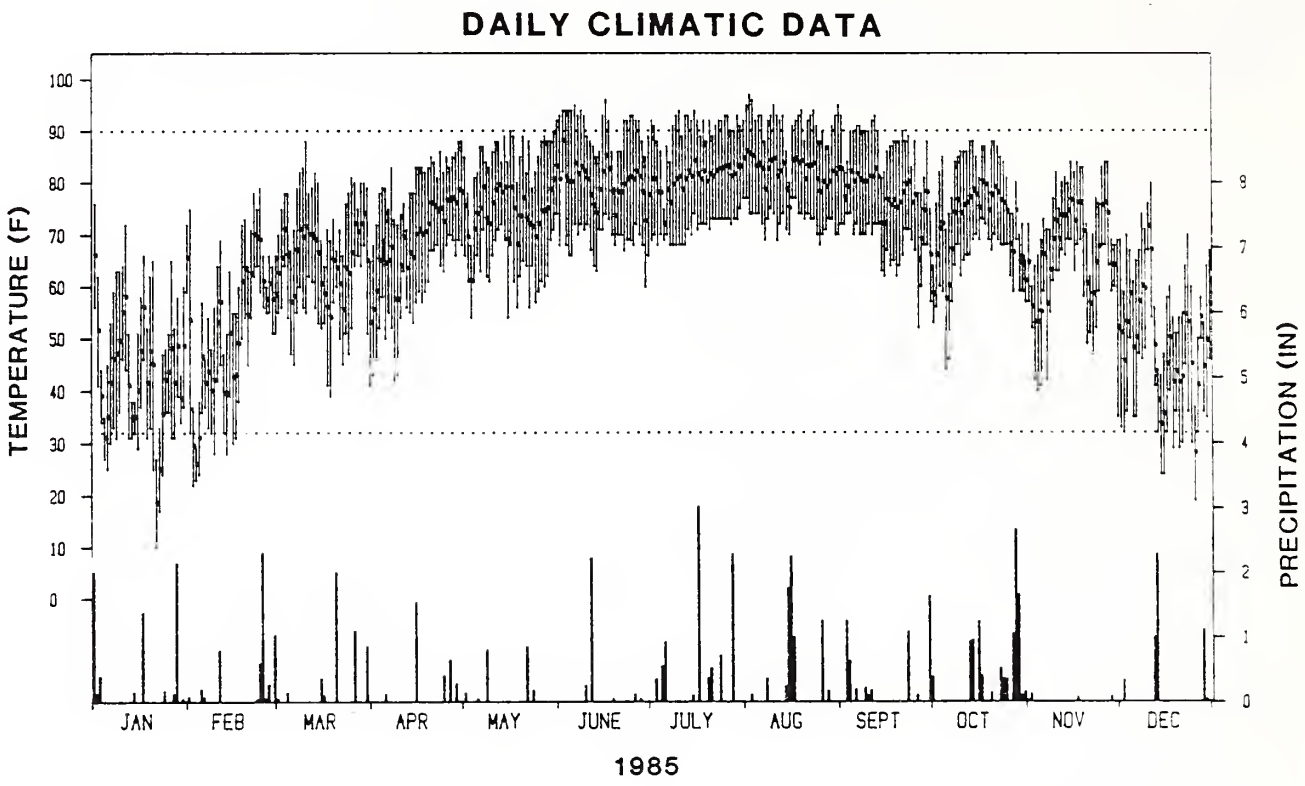

Table 1. Summary of the 1985 climatic data from St. Gabriel, Louisiana.

TEMPERATURE

MONTH	AVG MAX	AVG MIN	ABS MAX	ABS MIN	AVG TEMP	GDD 50	GDD 60	DAYS >90	DAYS <32	HDD	CDD
JAN	54.0	33.9	76	10	44.0	52	12	0	15	654	2
FEB	59.7	41.3	79	22	50.5	151	37	0	10	419	14
MAR	75.3	54.5	88	39	64.9	463	175	0	0	75	72
APR	79.3	57.6	88	41	68.5	554	271	0	0	46	149
MAY	85.0	63.5	90	54	74.3	752	442	2	0	4	291
JUN	90.5	69.0	96	60	79.8	901	601	19	0	0	451
JUL	90.3	70.8	94	66	80.6	946	636	21	0	0	481
AUG	91.4	72.9	97	68	82.2	997	687	24	0	0	532
SEP	87.5	67.4	95	52	77.5	832	532	13	0	0	382
OCT	81.0	63.3	88	44	72.1	687	381	0	0	20	241
NOV	74.9	57.9	84	40	66.4	493	224	0	0	80	123
DEC	59.8	37.2	80	19	48.5	96	23	0	12	521	8

PRECIPITATION

MONTH	TOTAL	DEPARTURE	GREATEST 24 HOUR	PERCENT RAINDAYS	CUMULATIVE TOTAL	DEPARTURE FROM NORMAL
JAN	6.57		2.15	39	6.57	
FEB	4.43		2.31	39	11.00	
MAR	5.67		2.00	29	16.67	
APR	3.00		1.54	23	19.67	
MAY	2.03		0.85	19	21.70	
JUN	2.69		2.22	23	24.39	
JUL	8.85		3.02	39	33.24	
AUG	7.14		2.25	35	40.28	
SEP	4.75		1.63	30	45.03	
OCT	10.89		2.66	45	55.92	
NOV	0.29		0.12	13	56.21	
DEC	5.50		2.02	19	61.71	

Temperatures from LSU-Ben Hur Research Farm
Plot and Data Summary from Louisiana Office of State Climatology - LSU.

Table 2. Infield tests planted at St. Gabriel Research Station in 1985.

Series	Soil Texture	Planting Date
1982 L&CP	Commerce silt loam	09/18/85
1982 L&CP	Sharkey clay	09/18/85
1983 L&CP	Commerce silt loam	09/23/85
1983 L	Sharkey clay	10/07/85
1984 L	Commerce silt loam	09/26/85
1985 L	Commerce silt loam	10/22/85

Table 3. 1985 Infield variety trial results from the second stubble of the 1979 CP series on Commerce silt loam at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	15.9	2.17	14635	17.6	257	4069
CP 70-321	14.1	1.94	14548	17.1	250	3509
CP 74-383	22.0	2.00	22464	17.8	261	5744
CP 79-318	16.9	2.02	16664	17.7	257	4337
CP 79-348	26.4	2.17	24363	18.2	267	7045
LSD (.05)	4.8	0.21	5349	NS	NS	1122
HSD (.05)	7.5	0.33	8335	NS	NS	1748

Planting Date: 9-2-82 Number of Replications: 3
Harvest Date: 10-22-85 Plot Size: 16 feet, 3 rows

Table 4. 1985 Infield variety trial results from the second stubble of the 1980 CP and 1981 L series on Sharkey clay soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	25.0	2.27	22122	16.1	232	5809
CP 70-321	36.4	2.49	29233	17.2	250	9119
CP 70-330	26.7	2.39	22764	17.2	252	6710
CP 74-383	45.9	2.22	41326	15.4	219	10031
CP 80-323	38.6	2.16	35845	16.2	231	8915
CP 80-356	30.8	2.78	22235	16.9	246	7585
LCP 81-010	28.6	1.91	29950	17.6	257	7345
LCP 81-030	36.5	2.44	29957	17.1	248	9026
LSD	3.8	.40	6193	NS	NS	1786
HSD	6.7	.75	10778	NS	NS	3109

Planting Date: 9-28-82 Number of Replications: 2
Harvest Date: 11-7-85 Plot Size: 16 feet, 3 rows

Table 5. 1985 Infield variety trial results from the plant cane of the 1981 L series on Commerce silt loam soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	29.4	2.54	25410	17.7	258.7	7679
CP 70-321	40.3	2.63	30704	17.4	256.7	10320
CP 74-383	64.6	3.33	38720	15.8	229.5	14813
L 81-010	74.2	4.03	36905	16.2	234.3	17360
L 81-030	48.0	3.30	29040	16.8	246.2	11833
LSD (.05)	11.8	.56	7930	1.6	27.3	3242
HSD (.05)	17.8	.85	13306	2.5	42.1	4882

Planting Date: 9-16-84 Number of Replications: 3
Harvest Date: 12-5-85 Plot Size: 16 feet, 3 rows

Table 6. 1985 Infield variety trial results from the first stubble of the 1981 L & CP series on Commerce silt loam soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	35.1	2.35	30006	15.5	221	7760
CP 70-321	35.7	2.35	30452	17.3	253	9052
CP 74-383	35.4	2.45	29020	16.4	238	8336
LCP 81-010	38.2	2.89	26432	15.5	222	8491
LCP 81-030	36.1	2.92	24749	18.8	277	10012
CP 81-325	33.5	3.05	22096	16.5	239	7990
CP 81-332	30.1	2.33	26515	17.7	254	7622
LSD	NS	NS	NS	NS	NS	NS
HSD	NS	NS	NS	NS	NS	NS

Planting Date: 9-26-1983 Number of Replications: 2
Harvest Date: 11-4-85 Plot Size: 16 feet, 3 rows

Table 7. 1985 Infield variety trial results from the first stubble of the 1981 L series on Sharkey clay soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	51.3	2.50	40384	15.6	223	11226
CP 70-321	46.1	2.55	36073	17.3	254	11601
CP 70-330	57.4	3.10	36981	16.1	231	13259
CP 74-383	52.7	2.20	48098	16.0	229	12100
LCP 81-010	62.0	3.25	38115	13.9	194	11991
LCP 81-030	36.3	2.35	30855	18.3	268	9642
LSD	NS	NS	10890	2.7	45	3626
HSD	NS	NS	16427	4.0	67	5469

Planting Date: 9-27-83 Number of Replications: 2
Harvest Date: 11-7-85 Plot Size: 16 feet, 3 rows

Table 8. 1985 Infield variety trial results from the second stubble of the 1981 L series on Commerce silt loam at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	27.2	2.39	22817	16.5	237	6419
CP 70-321	32.1	2.38	27034	17.3	252	8095
CP 74-383	38.5	2.29	33792	16.2	233	8961
LCP 81-010	39.4	2.61	30170	15.0	212	8335
LCP 81-030	37.4	2.48	30367	18.6	271	10153
LSD	3.3	NS	NS	1.4	25	1591
HSD	4.8	NS	NS	2.1	36	2297

Planting Date: 9-22-82 Number of Replications: 2
Harvest Date: 10-23-85 Plot Size: 16 feet, 3 rows

Table 9. 1985 Infield variety trial results from the second stubble of the 1981 CP and 1982 L series on Commerce silt loam soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	21.4	1.76	24320	16.7	242	5172
CP 70-321	30.7	1.88	32628	16.8	245	7525
CP 74-383	40.1	1.87	42900	15.9	229	9175
CP 81-325	21.2	2.65	16012	15.8	229	4859
CP 81-332	24.5	2.00	24471	16.9	243	5951
LCP 82-046	28.4	1.63	34894	16.1	231	6569
LCP 82-053	28.7	1.72	33384	16.9	249	7132
LCP 82-058	27.2	1.67	32628	17.8	260	7080
LCP 82-073	29.1	2.23	26133	17.2	251	7292
LCP 82-089	22.3	1.39	32024	17.0	246	5492
LCP 82-094	29.9	1.97	30363	16.6	239	7143

Planting Date: 10-20-82 Number of Replications: 1
Harvest Date: 11-5-85 Plot Size: 16 feet, 3 rows

Table 10. 1985 Infield variety trial results from the plant cane of the 1982 L & CP series on Commerce silt loam soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	32.4	3.30	19511	18.4	270	8727
CP 70-321	48.6	2.90	33351	16.7	245	11860
CP 70-330	46.8	3.75	24957	15.8	230	10675
CP 74-383	60.6	3.05	39704	15.4	223	13498
LCP 82-046	47.7	2.80	34032	13.6	190	9058
LCP 82-053	37.7	2.70	26999	14.7	213	7805
LCP 82-058	44.0	2.75	31990	16.0	232	10178
LCP 82-073	50.7	4.25	23822	16.2	236	11915
LCP 82-089	65.7	2.95	44468	15.3	219	14452
LCP 82-094	53.1	3.55	30628	16.1	234	12369
CP 82-512	52.7	3.60	29267	14.3	205	10738
CP 82-513	62.0	3.60	34712	17.4	254	15706
CP 82-519	54.5	3.00	36300	16.5	240	13018
CP 82-520	70.7	3.80	37208	15.5	223	15745
CP 82-527	71.9	3.45	41972	13.5	189	13630
CP 82-537	33.9	2.30	32897	16.6	245	8289

(continued)

Table 10 (continued)

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 82-541	49.5	3.20	30402	14.5	206	10013
CP 82-546	53.7	3.05	35166	16.5	242	12999
CP 82-547	62.3	2.90	43107	15.6	226	14032
CP 82-550	44.8	2.55	35393	18.4	272	12130
CP 82-551	47.2	2.90	32443	16.3	237	11209
CP 82-552	31.3	2.55	24503	14.9	215	6697
CP 82-559	61.6	2.95	41518	15.9	232	14346
LSD	19.3	.75	9570	2.1	35	4597
HSD	20.4	.88	12097	2.8	45	4665

Planting Date: 9-17-84 Number of Replications: 2
Harvest Date: 12-10-85 Plot Size: 16 feet, 3 rows

Table 11. 1985 Infield variety trial results from the plant cane of the 1982 L series on Sharkey clay soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	42.2	2.65	31990	16.7	240	10143
CP 70-321	43.2	2.65	32444	16.8	244	10367
CP 74-383	55.9	2.90	38569	14.4	204	11382
LCP 82-046	53.3	3.10	34258	15.6	223	11908
LCP 82-053	55.6	3.40	32670	14.0	197	10966
LCP 82-058	33.9	2.60	25864	16.1	232	7691
LCP 82-073	47.9	3.30	29041	15.1	214	10235
LCP 82-089	52.4	2.90	35846	16.4	235	12260
LCP 82-094	48.5	3.20	30402	16.3	233	11292
LSD	12.6	.54	7453	1.7	28	2907
HSD	33.9	1.32	16968	3.5	60	7894

Planting Date: 9-19-84 Number of Replications: 2
Harvest Date: 11-26-85 Plot Size: 16 feet, 3 rows

Table 12. 1985 Infield variety trial results from the first stubble of the 1982 L series on Commerce silt loam soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	28.3	2.45	23142	18.5	270	7702
CP 70-321	45.2	2.95	30629	18.1	266	12016
CP 70-330	45.3	3.04	29857	16.7	244	11077
CP 74-383	44.3	2.35	37435	17.0	245	10819
LCP 82-046	51.8	3.05	33805	17.5	255	13203
LCP 82-053	38.9	2.70	28360	16.7	243	9597
LCP 82-058	56.1	2.85	39476	18.1	265	14814
LCP 82-073	41.8	2.85	28587	17.2	250	10079
LCP 82-089	47.7	2.20	43561	18.0	262	12545
LCP 82-094	38.2	2.40	32217	16.6	238	9047
LSD	18.1	.61	11339	2.1	34	4977
HSD	29.9	1.01	18717	3.4	56	8215

Planting Date: 10-3-83 Number of Replications: 2
Harvest Date: 12-3-85 Plot Size: 16 feet, 3 rows

Table 13. 1985 Infield variety trial results from the first stubble of the 1982 L series on Sharkey clay soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	23.8	2.55	18831	15.1	214	5023
CP 70-321	50.7	2.55	39930	15.6	223	11313
CP 70-330	45.6	3.63	25751	16.5	240	10982
CP 74-383	46.3	2.60	35620	14.4	201	9271
LCP 82-046	69.1	3.10	44468	13.5	186	12922
LCP 82-053	50.1	2.65	37208	14.4	205	10081
LCP 82-058	44.9	2.65	33805	14.4	201	8973
LCP 82-073	47.2	3.20	29267	16.3	234	11170
LCP 82-089	53.3	2.90	36754	15.3	216	11657
LCP 82-094	33.9	2.50	27679	15.2	214	7275
LSD	NS	.78	NS	2.0	34	NS
HSD	NS	1.29	NS	3.2	55	NS

Planting Date: 10-4-83 Number of Replications: 2
Harvest Date: 11-8-85 Plot Size: 16 feet, 3 rows

Table 14. 1985 Infield variety trial results from the plant cane of the 1983 L series on Commerce silt loam soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)	Fiber[1] %
CP 65-357	34.0	2.97	22896	19.2	280	9534	16.6
CP 70-321	39.3	2.58	30465	17.7	261	10246	12.6
CP 72-356	31.7	2.85	22246	17.9	261	8280	14.5
CP 74-383	52.9	2.93	36109	16.7	242	12786	14.3
LCP 83-119	37.8	2.82	26809	12.8	176	6649	13.5
LCP 83-122	43.1	2.13	40469	17.6	257	11064	15.6
LCP 83-123	36.3	2.48	29274	16.6	238	8650	16.6
LCP 83-126	34.7	2.30	30174	15.5	223	7752	12.8
LCP 83-129	39.3	2.50	31440	18.1	265	10411	16.8
LCP 83-133	49.1	2.72	36103	15.0	211	10380	14.6
LCP 83-135	37.8	3.33	22703	17.1	246	9295	14.8
LCP 83-136	46.8	2.15	43535	16.5	240	11227	.
LCP 83-137	43.1	2.43	35473	16.7	243	10469	12.6
LCP 83-138	30.2	2.72	22206	16.8	246	7438	13.5
LCP 83-140	37.8	2.59	29189	15.4	222	8384	19.0
LCP 83-144	39.3	2.87	27387	16.5	240	9428	14.4
LCP 83-146	37.8	2.71	27897	17.2	249	9424	15.3
LCP 83-149	35.5	2.67	26592	17.3	252	8950	13.6
LCP 83-151	52.9	2.62	40382	18.2	265	14029	14.2
LCP 83-153	38.5	2.56	30078	16.9	246	9471	14.0
LCP 83-154	37.8	1.86	40645	18.2	266	10047	15.3
LCP 83-158	43.1	2.66	32406	17.7	258	11103	14.5
LCP 83-159	38.5	2.70	28519	19.7	292	11257	12.7
LCP 83-164	34.0	2.31	29437	17.5	258	8782	14.9
LCP 83-165	43.8	2.45	35755	18.2	266	11642	15.2
LCP 83-169	38.5	2.08	37019	18.3	270	10387	17.1
LCP 83-179	47.6	2.72	35000	17.7	258	12262	16.0
LCP 83-189	34.0	2.28	29825	17.9	261	8881	14.9
LCP 83-193	53.6	2.92	36712	17.7	259	13904	14.4
LCP 83-194	36.3	3.14	23121	17.2	252	9140	18.9

Planting Date: 10-3-84 Number of Replications: 1
Harvest Date: 12-2-85 Plot Size: 16 feet, 3 rows

[1] Due to circumstances beyond control, a period of ten days elapsed between time samples were cut and when they were analyzed.

Table 15. 1985 Infield variety trial results from the plant cane of the 1983 L series on Sharkey clay soil at St. Gabriel

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	40.0	2.73	29304	16.0	229	9140
CP 70-321	37.8	2.78	27194	15.6	224	8479
CP 72-356	37.8	2.55	29647	14.6	205	7760
CP 74-383	31.0	2.22	27928	17.0	245	7595
LCP 83-119	38.5	2.55	30196	13.0	177	6795
LCP 83-122	39.3	2.42	32479	15.5	222	8705
LCP 83-123	41.5	2.62	31679	16.3	233	9674
LCP 83-126	45.3	2.76	32826	16.5	239	10809
LCP 83-129	36.3	2.48	29274	16.6	241	8741
LCP 83-133	37.8	2.57	29416	14.0	196	7390
LCP 83-135	34.0	3.05	22295	15.3	215	7320
LCP 83-136	45.3	2.30	39391	16.3	236	10700
LCP 83-137	39.3	2.24	35089	15.9	228	8968
LCP 83-138	15.1	2.87	10523	14.2	201	3035
LCP 83-140	34.0	2.17	31336	14.4	202	6875
LCP 83-144	32.5	2.83	22968	12.8	175	5697
LCP 83-146	43.1	3.27	26361	16.6	238	10271
LCP 83-149	34.7	2.68	25896	15.4	218	7568
LCP 83-151	41.5	2.17	38249	16.9	244	10130
LCP 83-153	36.3	2.18	33303	15.2	217	7873
LCP 83-154	36.3	1.51	48079	17.3	252	9129
LCP 83-158	39.3	2.64	29773	17.8	260	10206
LCP 83-159	43.1	2.98	28926	17.6	257	11090
LCP 83-164	35.5	2.16	32870	15.9	228	8101
LCP 83-165	41.5	2.47	33603	15.9	226	9391
LCP 83-169	38.5	2.35	32766	14.6	208	8000
LCP 83-179	46.8	2.88	32500	14.0	192	9004
LCP 83-189	31.0	2.25	27556	15.9	228	7056
LCP 83-193	44.6	2.82	31631	16.0	230	10245
LCP 83-194	37.8	2.79	27097	16.2	233	8823

Planting Date: 10-4-84 Number of Replications: 1
Harvest Date: 11-21-85 Plot Size: 16 feet, 3 rows

Table 16. 1985 Infield variety trial results from the first stubble of the 1983 L series on Commerce silt loam soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	36.2	2.44	29706	17.4	254	9180
CP 70-321	26.7	2.16	24698	18.6	276	7377
CP 74-383	30.3	2.05	29534	17.6	258	7814
LCP 83-119	39.8	2.81	28325	15.3	217	8621
LCP 83-122	29.8	1.92	31088	17.0	248	7393
LCP 83-123	37.7	2.00	37651	18.6	273	10300
LCP 83-126	23.8	2.10	22625	15.7	225	5360
LCP 83-129	24.4	1.78	27461	17.7	261	6361
LCP 83-133	37.8	2.39	31606	15.6	225	8501
LCP 83-135	40.5	2.95	27461	16.6	238	9651
LCP 83-136	30.5	1.87	32642	19.0	282	8595
LCP 83-137	36.1	1.70	42487	17.9	263	9498
LCP 83-138	55.9	2.53	44214	16.5	238	13304
LCP 83-140	40.3	2.18	36960	16.8	244	9825
LCP 83-144	42.9	2.24	38342	17.1	250	10738
LCP 83-146	30.0	2.50	24007	17.9	261	7836
LCP 83-149	36.9	2.50	29534	17.7	259	9550
LCP 83-151	47.5	2.22	42832	18.0	262	12450
LCP 83-153	35.8	2.22	32297	19.2	283	10128
LCP 83-154	34.5	1.81	38169	19.5	288	9919
LCP 83-158	47.0	2.43	38687	18.3	268	12596
LCP 83-159	44.7	2.54	35233	20.6	306	13687
LCP 83-164	36.2	1.84	39378	17.8	263	9513
LCP 83-165	39.4	2.14	36788	16.9	245	9669
LCP 83-169	43.3	2.24	38687	16.5	241	10414
LCP 83-179	41.1	2.07	39724	18.0	262	10772
LCP 83-189	31.3	1.56	40069	18.2	268	8379
LCP 83-193	48.8	2.58	37824	17.5	257	12542
LCP 83-194	41.4	2.35	35233	17.2	252	10449

Planting Date: 10-17-83 Number of Replications: 1
Harvest Date: 11-12-85 Plot Size 14 feet, 3 rows

Table 17. 1985 Infield variety trial results from the plant cane of the 1984 L series on Commerce silt loam soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)
CP 65-357	40.8	2.52	32412	18.8	273	11111
CP 70-321	34.4	2.63	26201	16.3	236	8121
CP 74-383	48.8	2.86	34125	15.4	220	10728
LCP 84-200	39.3	2.54	30945	17.9	261	10265
LCP 84-205	43.1	2.79	30896	15.4	219	9452
LCP 84-210	33.2	3.32	20000	17.4	256	8483
LCP 84-211	43.1	2.87	30035	17.0	244	10508
LCP 84-212	42.3	2.64	32045	17.2	249	10520
LCP 84-214	40.0	2.84	28169	18.3	269	10768
LCP 84-215	37.0	2.42	30579	17.2	251	9294
LCP 84-218	42.3	3.00	28200	15.9	228	9627
LCP 84-222	46.8	3.35	27940	15.9	227	10624
LCP 84-224	47.6	2.71	35129	15.9	226	10743
LCP 84-226	37.8	2.21	34208	17.7	259	9783
LCP 84-229	46.1	1.99	46332	13.8	191	8814
LCP 84-234	42.3	1.92	44062	16.3	237	10042
LCP 84-239	41.5	2.65	31321	16.6	241	9993
LCP 84-244	43.1	3.25	26523	14.7	207	8939
LCP 84-245	46.8	2.84	32958	16.5	237	11078
LCP 84-247	31.0	2.44	25410	17.9	260	8060
LCP 84-249	37.8	2.30	32870	16.7	239	9019
LCP 84-253	45.3	3.12	29038	15.1	215	9730
LCP 84-254	40.8	3.69	22114	17.6	257	10498
LCP 84-257	41.5	3.33	24925	17.0	248	10271
LCP 84-260	33.2	2.66	24962	15.6	220	7301
LCP 84-261	46.8	3.25	28800	15.6	223	10436
LCP 84-262	36.3	2.46	29512	16.8	243	8806
LCP 84-263	43.8	2.66	32932	15.7	223	9781
LCP 84-264	46.8	2.98	31409	18.2	265	12383
LCP 84-265	45.3	2.24	40446	16.6	238	10768
LCP 84-266	41.5	3.35	24776	17.4	252	10475
LCP 84-268	28.7	3.60	15944	17.0	245	7032

Planting Date: 10-26-84 Number of Replications: 1
Harvest Date: 12-17-85 Plot Size: 16 feet, 3 rows

Table 18. 1985 Infield variety trial results from the plant cane of the 1984 L series on Sharkey clay soil at St. Gabriel.

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)	Fiber %
LCP 61-037	33.1	2.90	22828	13.8	234	7732	12.2
CP 65-357	49.2	2.67	36854	16.1	268	13166	13.0
CP 70-321	29.8	2.95	20203	17.8	319	9500	9.6
CP 74-383	54.8	3.23	33932	17.4	302	16533	11.8
LCP 84-200	54.8	3.17	34574	16.3	280	15333	12.8
LCP 84-205	30.6	3.26	18773	16.5	291	8895	9.9
LCP 84-210	29.0	3.86	15026	17.2	304	8828	10.3
LCP 84-211	36.3	2.50	29040	15.8	270	9797	11.8
LCP 84-212	38.7	2.92	26507	15.2	257	9958	11.8
LCP 84-214	41.9	3.10	27032	15.1	255	10668	12.2
LCP 84-215	43.2	2.25	38445	16.1	277	11947	14.0
LCP 84-218	35.5	3.23	21981	15.1	260	9226	10.3
LCP 84-222	58.1	1.95	59590	14.7	249	14490	11.5
LCP 84-224	53.2	2.73	38974	12.5	211	11199	8.9
LCP 84-226	37.9	2.12	35755	14.1	244	9255	9.5
LCP 84-229	33.9	2.21	30679	14.1	240	8143	9.6
LCP 84-238	43.5	2.12	41038	16.7	285	12389	13.8
LCP 84-239	38.7	3.21	24112	16.5	281	10879	13.8
LCP 84-244	41.9	2.50	33520	16.1	272	11376	14.5
LCP 84-245	53.2	3.06	34771	14.7	251	13327	10.9
LCP 84-247	43.5	2.62	33206	16.2	276	12015	12.6
LCP 84-249	32.3	2.38	27143	15.4	269	8676	9.9
LCP 84-253	36.3	2.87	25296	13.3	227	8244	8.4
LCP 84-254	34.7	4.49	15457	16.3	283	9817	12.1
LCP 84-257	46.0	3.60	25556	14.9	258	11863	10.2
LCP 84-260	37.9	2.97	25522	14.1	233	8831	13.1
LCP 84-261	49.2	2.79	35269	14.2	242	11897	10.6
LCP 84-262	39.5	2.24	35268	15.1	158	10203	11.5
LCP 84-263	33.1	3.09	21424	14.2	237	7848	12.3
LCP 84-264	56.5	2.47	45749	16.5	282	15939	13.4
LCP 84-265	46.0	2.54	36220	16.6	286	13156	12.2
LCP 84-266	38.7	2.95	26237	19.1	341	13204	13.4
LCP 84-268	32.3	3.28	19695	16.2	279	9018	12.6
LCP 84-273	32.3	2.60	24846	17.9	307	9903	14.1
LCP 84-274	30.6	2.94	20816	15.8	273	8351	11.4
LCP 84-275	37.9	2.10	36095	16.3	282	10688	12.5
LCP 84-276	45.2	3.26	27730	15.2	260	11738	12.4
LCP 84-277	28.2	2.64	21364	14.7	245	6901	13.1
LCP 84-278	37.1	3.50	21200	14.2	238	8826	12.3
LCP 84-280	33.9	2.32	29224	16.6	288	9756	13.9
LCP 84-281	35.5	2.57	27626	14.2	239	8481	12.9

(continued)

Table 18 (continued)

Variety	Cane/ Acre (Tons)	Stalk Weight (lbs)	Stalks/ Acre (No.)	Juice Sucrose (%)	Sugar/ Ton (lbs)	Sugar/ Acre (lbs)	Fiber %
LCP 84-282	39.5	2.28	34649	15.4	260	10274	12.6
LCP 84-287	38.7	2.94	26327	15.9	274	10588	12.3
LCP 84-288	41.1	3.00	27400	12.4	208	8528	9.6
LCP 84-290	42.7	2.18	39174	16.7	289	12349	11.6
LCP 84-291	41.9	2.96	28311	14.7	256	10710	9.8

Planting Date: 11-15-84 Number of Replications: 1
Harvest Date: 12-17-85 Plot Size: 15 feet, 3 rows

Results from the Outfield Variety Trials Harvested in 1985[1/]

Eugene LeBlanc and Mike Giamalva

Sugar Station

Outfield variety testing is the final stage of the Louisiana sugarcane variety development program. In these trials unreleased varieties are tested against recommended commercial varieties under commercial farm conditions. Within the locations of these tests the soil types, managerial structures, and weather patterns of the major sugarcane producing areas of the state should be represented.

The 1985 growing season began with severe cold temperatures in January. A near normal spring and summer resulted in good stands of cane throughout the belt. The outfield locations were frequently visited for various reasons throughout the growing season and the harvest season. Pathologists and entomologists from both LSU and USDA evaluated insect and disease statuses at the outfield locations. These data were recorded and used by the scientists in their respective disciplines to evaluate the resistance and/or susceptibility of all unreleased varieties to specific crop pests.

Hurricane Danny in August caused some wind damage and flooding in the Teche region. This impeded and delayed planting in most of the cane belt. Planting conditions were normal in the beginning, but wet weather delayed the planting of three tests. (Table 1).

After getting off to a normal start, the harvest season was drastically affected by Hurricane Juan. Harvest conditions varied due to the adverse weather and crop conditions. Tests harvested before Juan were generally erect. Tests harvested after Jaun were lodged to varying degrees. Both one-row and two-row harvesters were used to harvest outfield tests.

The data obtained in 1985 for sugar per acre, sugar per ton, tons of cane per acre, stalks per acre and mean stalk weight in plant cane, first stubble, and second stubble are presented in Tables 3 through 17. In these tables, averages of all replications for each variety at each location are shown directly under each specific data heading.[1/]

[1/] The data for this report were obtained through a cooperative effort of personnel from the Louisiana Agricultural Experimental Station/LSUAC, USDA- Agricultural Research Service, Sugarcane Research Unit; and the American Sugar Cane League in accordance to the provisions of the "Three-way Agreement of 1978". The testing program would not be possible without full cooperation from the growers at each outfield location.

Table 1. Locations and dates of planting for the LSU outfield trials planted in 1985.

Location	Date Planted	Soil Type
A. V. Allain and Sons	11/13/85	Heavy
Cinclare	09/25/85	Light
Evan Hall	11/19/85	Heavy
Frank Pearce and Sons	11/21/85	Light
Glenwood	10/09/85	Light
Lanaux's	10/02/85	Light

Table 2. Varieties planted in 1985 outfield plots.

Commercial varieties	Experimental varieties	Varieties introduced to outfield	
CP 65-357	CP 79-318	LCP 82-46	CP 82-527
CP 70-321	CP 79-332	LCP 82-53	CP 82-537
CP 72-356	CP 79-348	LCP 82-58	CP 82-541
CP 72-370	CP 80-323	LCP 82-73	CP 82-546
CP 74-383	CP 80-356	LCP 82-89	CP 82-547
CP 76-331	LCP 81-10	LCP 82-94	CP 82-550
CP 65-357 KT[1/]	LCP 81-30	CP 82-512	CP 82-551
	CP 81-304	CP 82-513	CP 82-552
	CP 81-325	CP 82-519	CP 82-559
	CP 81-335	CP 82-520	CP 70-321 KT[1/]

[1/] KT represents Kleentek seed source of this commercial variety.

Table 3. The 1985 results for the plant cane outfield variety trial at Glenwood.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357KT	1.73	40243	34.5	223.9	7769
CP70-321	2.41	24230	29.2	246.1	7203
CP72-356	2.61	23383	30.5	231.9	7054
CP72-370	2.32	28199	32.8	239.9	7872
CP74-383*	2.18	39685	43.3	209.8	9084
CP76-331	2.45	26798	32.7	257.2	8426
CP79-318	2.20	30097	33.1	247.4	8178
CP79-332	2.15	28713	30.8	251.1	7739
CP79-348	2.56	27571	35.2	196.2	6893
CP80-323	2.55	24426	31.2	241.0	7519
CP80-356	2.86	23003	32.8	225.3	7373
HSD					
.05	.55	7773	6.6	38.9	NS

Date Planted: 10/29/84 Soil Type: Light
Date Harvested: 12/3/85 Harvest Conditions: Partially lodged, dry

KT represents Kleentek seed source of this commercial variety.
* Only one replication used in the analysis.

Table 4. The 1985 results from the first stubble outfield variety trial at Glenwood.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	1.97	25380	25.0	201.2	5039
CP65-357KT	1.69	32632	27.3	196.8	5375
CP70-321	2.14	25648	27.2	228.2	6231
CP72-356	2.01	23561	23.7	231.8	5505
CP72-370	1.96	30112	29.6	231.8	6878
CP74-383	2.04	38513	39.1	197.2	7740
CP76-331	2.10	30000	31.3	222.1	6967
CP79-318	1.67	36280	30.2	223.1	6716
CP79-332	2.08	25839	26.8	232.0	6215
CP79-348	2.29	22313	25.0	185.9	4636
HSD					
.05	.48	12680	10.6	37.1	2514

Date Planted: 9/29/83 Soil Type: Light
Date Harvested: 10/5/85 Harvest Conditions: partially lodged, dry

KT represents Kleentek seed source of this commercial variety.

Table 5. The 1985 results from the second stubble outfield variety trial at Glenwood.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	1.78	13070	11.5	216.0	2495
CP70-321	1.85	18748	17.3	233.3	4041
CP72-356	1.80	23086	20.6	226.1	4647
CP72-370	1.75	20903	18.2	234.2	4252
CP74-383	1.79	30887	27.7	202.1	5584
CP76-331	2.05	12584	12.9	230.0	2971
HSD					
.05	NS	7111	4.5	19.9	1136

Date Planted: 9/22/82 Soil Type: Light
Date Harvested: 10/5/85 Harvest Conditions: Partially lodged, Dry

Table 6. The 1985 results from the plant cane outfield variety trial at Lanaux's.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	2.47	21771	27.0	242.9	6555
CP65-357KT	1.83	28392	26.1	231.9	6054
CP72-356	2.77	22515	31.0	248.9	7720
CP72-370	2.76	20519	28.2	249.8	7065
CP74-383	2.62	26424	34.5	234.5	8097
CP76-331	2.68	24718	33.1	256.3	8485
CP79-318	2.45	26043	31.7	254.3	8093
CP79-332	2.41	25003	30.1	251.6	7549
CP79-348	2.63	27484	36.1	207.2	7446
CP80-323	2.32	27618	32.0	232.0	7440
CP80-356	2.96	15932	23.4	229.1	5382
HSD					
.05	.60	9334	10.9	NS	2947

Dated Planted: 9/18/84 Soil Type: Light
Date Harvested: 11/15/85 Harvest Conditions: Partially lodged, dry

KT represents Kleentek seed source of this commercial variety.

Table 7. The 1985 results in the first stubble outfield test at Lanaux's.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	2.01	26523	26.6	263.3	7031
CP65-357KT	1.62	36512	29.3	248.3	7282
CP70-321	2.44	29357	35.7	244.9	8753
CP72-356	1.87	27489	25.8	275.0	7083
CP72-370	2.17	26727	28.9	253.3	7309
CP74-383	2.28	36386	41.4	253.4	10514
CP76-331	2.27	29888	33.8	271.0	9176
CP79-318	2.14	30083	32.2	264.6	8576
CP79-332	2.10	26720	28.1	259.0	7262
CP79-348	2.27	30500	34.7	240.1	8345
HSD					
.05	.28	7838	5.8	32.8	1946

Date Planted: 9/27/83 Soil Type: Light
Date Harvested: 12/5/85 Harvest Conditions: Partially lodged, dry

KT represents Kleentek seed source of this commercial variety.

Table 8. The 1985 results in the second stubble outfield test at Lanaux's.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	1.98	24922	24.5	185.1	4567
CP70-321	2.21	16179	18.1	214.6	3897
CP72-356	1.98	24868	24.7	206.4	5068
CP72-370	2.06	24211	25.0	209.7	5249
CP74-383	1.91	32940	31.5	209.5	6608
CP76-331	2.09	28772	30.1	222.4	6732
HSD					
.05	NS	11856	NS	23.0	NS

Date Planted: 9/23/82 Soil Type: Light
Date Harvested: 10/25/85 Harvest Conditions: good, dry

Table 9. The 1985 results from the plant cane outfield test at Evan Hall.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357**	2.24	27725	30.9	237.2	7334
CP65-357KT	1.96	34005	32.0	214.3	6902
CP72-356	2.24	22001	24.6	212.7	5246
CP72-370**	2.11	29651	31.3	218.9	6851
CP74-383	2.34	24730	28.8	191.9	5512
CP76-331**	1.86	30943	28.6	224.5	6450
CP79-318	2.05	20871	21.4	242.9	5223
CP79-332**	2.18	22057	23.9	244.9	5864
CP79-348	2.28	26276	29.8	192.2	5737
CP80-323	2.00	27312	27.4	209.9	5744
CP80-356	2.61	26599	34.7	222.7	7731
HSD .05	.63	12635	5.2	45.4	1756

Date Planted: 10/10/84 Soil Type: Heavy
Date Harvested: 11/19/85 Harvest Conditions: Partially lodged, dry

KT represents Kleentek seed source of this commercial variety.
** Only two replications used in the analysis.

Table 10. The 1985 results from the first stubble outfield test at Evan Hall.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	1.92	25706	24.6	238.7	5888
CP65-357KT	1.45	37841	26.7	230.6	6174
CP65-357KT,SG	1.53	37525	28.6	233.8	6694
CP72-356	2.01	27543	27.7	241.1	6681
CP72-370	1.77	23901	21.1	237.0	5021
CP74-383	1.69	33770	28.5	221.8	6332
CP76-331	1.87	24848	23.1	252.3	5844
CP79-318	1.71	26057	22.0	263.3	5806
CP79-332	1.81	23948	21.7	259.0	5610
CP79-348	1.74	32715	28.5	214.5	6104
HSD .05	.38	12737	6.0	29.0	NS

Date Planted: 10/3/83 Soil Type: Heavy
Date Harvested: 11/18/85 Harvest Conditions: Partially lodged, dry

KT represents Kleentek seed source of this commercial variety.
KT,SG represents Kleentek seed source of this commercial variety that was grown at St. Gabriel.

Table 11. The 1985 results from the second stubble outfield test at Evan Hall.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	1.67	23139	19.3	229.6	4421
CP70-321	1.59	17768	14.1	234.3	3321
CP72-356	1.66	25419	20.8	229.6	4778
CP72-370	1.64	19889	16.3	229.5	3766
CP74-383	1.77	27646	24.0	201.7	4870
CP76-331**	1.68	14034	11.6	240.9	2750
HSD .05	NS	6593	5.6	28.9	1405

Date Planted: 9/30/82 Soil Type: Heavy
Date Harvested: 11/18/85 Harvest Conditions: Partially lodged, Dry

** Only two replications used in the analysis.

Table 12. The 1985 results from the plant cane outfield test at Cinclare.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	2.11	26826	28.4	255.8	7287
CP65-357KT	1.77	37862	33.5	258.8	8705
CP70-321	2.33	23487	27.5	272.3	7508
CP72-356	2.29	22866	26.1	265.2	6951
CP72-370	2.11	30285	31.9	250.5	7993
CP74-383	2.18	29459	32.1	254.0	8162
CP76-331	2.24	25711	28.4	271.4	7735
CP79-318	2.06	28402	29.3	262.9	7737
CP79-332	2.19	23306	25.4	272.3	6933
CP79-348	2.38	23100	27.4	254.0	6978
CP80-323	2.07	29182	30.2	261.5	7929
CP80-356	2.61	22419	29.1	258.3	7527
HSD					
.05	.39	8998	NS	NS	NS

Date Planted: 10/3/84 Soil Type: Light
Date Harvested: 11/26/85 Harvest Conditions: Partially lodged, Dry

KT represents Kleentek seed source of this commercial variety.

Table 13. The 1985 results from the first stubble outfield test at Cinclare.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	2.02	22596	22.9	229.2	5246
CP65-357KT	1.67	28231	20.7	214.1	4272
CP70-321	2.46	19771	24.3	261.2	6353
CP72-356	2.15	20621	22.2	251.2	5671
CP72-370	2.09	20464	21.4	249.6	5347
CP74-383	2.14	30183	32.2	227.4	7309
CP76-331	2.12	21397	22.8	230.8	5300
CP79-318	2.04	27267	27.8	242.7	6688
CP79-332	2.21	21405	23.1	254.7	5915
CP79-348	2.37	23053	27.3	219.6	5971
HSD					
.05	NS	NS	NS	36.5	NS

Date Planted: 9/30/83 Soil Type: Light
Date Harvested: 11/7/85 Harvest Conditions: Partially lodged, Dry

KT represents Kleentek seed source of this commercial variety.

Table 14. The 1985 results from the plant cane outfield test at Allain's.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	2.31	23836	27.5	273.9	7533
CP65-357KT	1.95	34049	33.2	249.7	8306
CP70-321	2.23	25599	28.5	247.6	7057
CP72-356	2.34	23626	27.6	234.0	6457
CP72-370	2.36	27088	31.8	258.5	8226
CP74-383	2.31	26246	30.3	247.6	7517
CP76-331	2.51	19039	23.9	258.9	6214
CP79-318	2.00	25960	25.9	267.3	6913
CP79-332	2.22	24701	27.2	265.9	7229
CP79-348	2.53	25312	32.1	230.9	7418
CP80-323	2.39	24305	29.0	260.7	7558
CP80-356	2.86	21393	30.6	252.1	7725
HSD .05	.46	5994	5.7	27.9	1441

Date Planted: 10/5/84 Soil Type: Heavy
Date Harvested: 11/14/85 Harvest Conditions: Partially lodged, Dry

KT represents Kleentek seed source of this commercial variety.

Table 15. The 1985 results from the first stubble outfield test at Allain's.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	1.53	19213	14.7	254.1	3731
CP70-321	1.66	28089	23.4	252.1	5904
CP72-356	1.57	31153	24.5	245.6	6039
CP72-370	1.69	29029	24.4	260.3	6388
CP74-383	1.63	33053	26.5	259.0	6898
CP76-331	1.57	28148	21.4	247.5	5328
CP78-318	1.42	26504	18.8	279.6	5275
CP78-332	1.44	30936	21.8	258.8	5675
CP78-348	1.93	23624	22.8	245.8	5621
HSD .05	.46	12246	6.8	NS	2425

Date Planted: 10/5/83 Soil Type: Heavy
Date Harvested: 11/14/85 Harvest Conditions: Partially lodged, Dry

Table 16. The 1985 results from the second stubble outfield test at Allain's.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	1.49	16344	12.2	240.9	2926
CP70-321	1.56	24827	19.4	228.8	4443
CP72-356	1.62	28078	22.7	229.5	5231
CP72-370	1.47	24009	17.4	239.2	4164
CP74-383	1.50	31688	23.6	241.0	5703
CP76-331	1.50	22058	16.5	235.7	3910
HSD .05	NS	7138	5.3	NS	1319

Date Planted: 9/29/82 Soil Type: Heavy
Date Harvested: 11/14/85 Harvest Conditions: Partially lodged, Dry

Table 17. The 1985 results from the plant cane outfield test at Frank Pearce's.

Variety	Mean Stalk Weight	Stalks Per Acre	Tons Per Acre	Sugar Per Ton	Sugar Per Acre
CP65-357	2.07	28483	29.5	266.9	7845
CP70-321	2.33	28002	31.3	256.3	8026
CP72-356	2.18	22529	24.7	272.1	6729
CP74-383	2.23	26318	29.3	258.8	7636
CP76-331	2.11	26307	27.6	273.7	7524
CP79-318	2.00	21486	21.0	270.0	5605
CP79-332	2.21	26558	29.5	268.7	7903
CP79-348	2.18	31515	34.5	240.2	8295
CP80-323	2.21	27923	31.0	259.2	8016
CP80-356	2.64	16783	22.3	255.0	5640
HSD .05	NS	NS	NS	NS	NS

Date Planted: 9/26/84
Date Harvested: 11/25/85
Soil Type: Light
Harvest Conditions: Partially lodged, Dry

Identification of Louisiana Sugarcane Varieties

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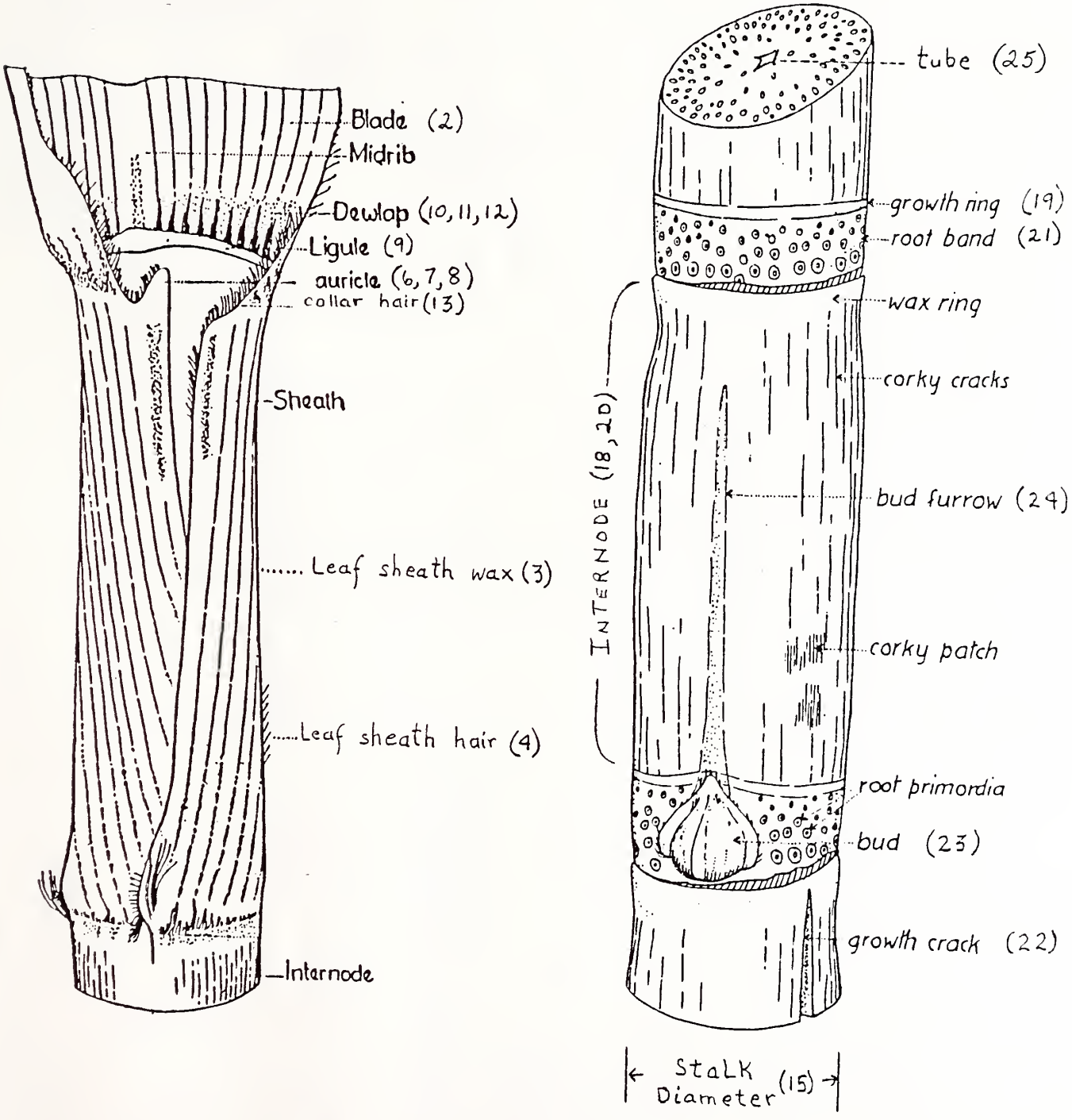
The average production life of a sugarcane variety in Louisiana is less than ten years. Some varieties are planted for a limited number of seasons before they are replaced with varieties that are more desirable to the industry. Little wonder that people often have difficulty identifying sugarcane varieties in Louisiana.

Several keys have been proposed for the identification of sugarcane varieties. Through the years the personnel of the Louisiana sugarcane breeding program have identified those key descriptions with which Louisiana sugarcane varieties can be distinguished. The vegetative characters are depicted in Figure 1. The ranges for these characters are given in Figure 2, and the specific value for each character for each current Louisiana variety is presented in Table 1.

Figure 1. Vegetative characters used in the description and idenfitication of sugarcane varieties.[1/]



[1/] Reproduced from Botany of Sugarcane by C. Van Dillewijn and "Sugarcane" Agriculture Handbook No. 122 by E. A. Artschwager and E. W. Brandes.

Figure 2. Vegetative characters and their range in values used to identify Louisiana sugarcane varieties.

1.) Canopy - 0 erect 9 drooping

2.) Leaf Blade Shape -

1. straight 4. curved middle
2. bent middle 5. curved near tip
3. bent near tip

3.) Leaf Sheath Wax - 0 none 9 wax rubs off easily

4.) Leaf Sheath Hair - 0 none 9 hairy

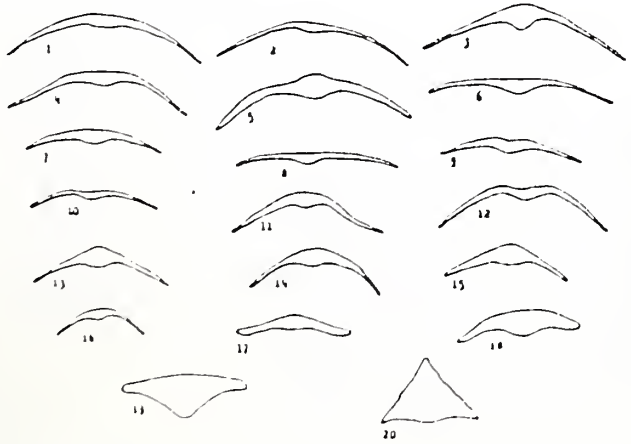
5.) Leaf Sheath Color* -

6.) Auricle - Yes or No

7.) Auricle Size - 0 none 9 long

8.) Auricle Shape -

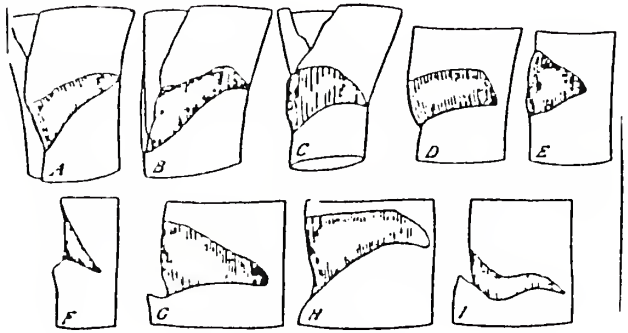
9.) Ligule Shape -



10.) Dewlap Color* -

11.) Dewlap Wax -

12.) Dewlap Shape -



13.) Collar Hair - 0 none 9 long hairy

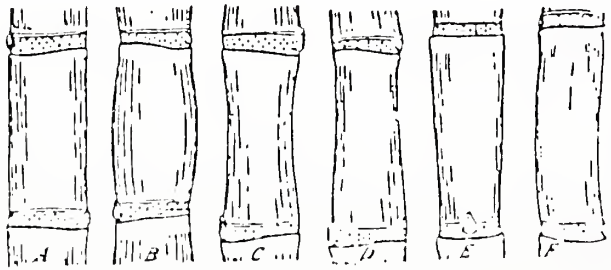
14.) Clinging of Trash - 0 tightly 9 easily shed

15.) Stalk Diameter - 0 small 9 large

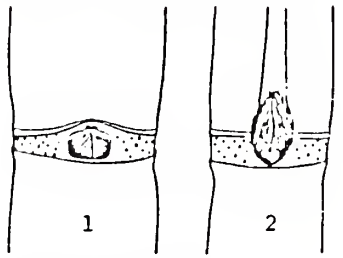
16.) Stalk Shape - 0 straight 9 zig-zag

17.) Stalk Wax - 0 none 9 waxy rubs off easily?

18.) Internode Pattern



19.) Type of Growth Ring -

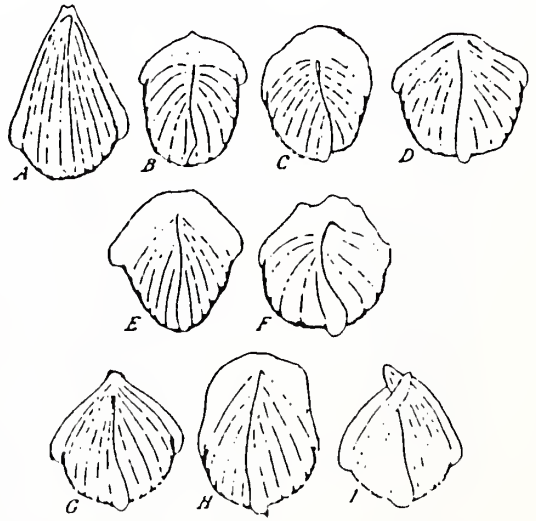


20.) Internode Color*
exposed_____ unexposed_____

21.) Root Band Color*

22.) Growth Cracks - 0 none 9 plenty

23.) Bud Shape



24.) Bud Groove - 0 none 9 deep

*Suggested Colors - White, cream, yellow, green, light green, green, olive green, brown bronze, tan, light red, red, light purple, dark purple, black.

Table 1. The varietal values of the vegetative characters used to identify Louisiana sugarcane varieties.

Character	Variety							
	CP61-37	CP65-357	CP70-330	CP70-321	CP72-356	CP72-370	CP74-383	CP76-331
1. Canopy	3	4	2	4	4	1	2	5
2. Leaf Blade	5	5	5	5	5	3	3	5
3. Leaf Sheath Wax	1, no	3, no	7, no	3, no	3, yes	8, yes	1, no	2, yes
4. Leaf Sheath Hair	0	2	6	1	2	1	0	7
5. Leaf Sheath Color	Lt. Grn.	Lt. Grn.	Lt. Grn.	Rd. Grn.	Rd. Grn.	Yw. Grn.	Lt. Grn.	Rd. Grn.
6. Auricle	yes	yes	yes	no	yes	yes	yes	yes
7. Auricle Size	3	2	2	-	7	3	4	1
8. Auricle Shape	8	4	8	-	8	8	8	4
9. Ligule Shape	18	18	5	13	13	19	13	18
10. Dewlap Color	Lt. Brn.	Ol. Grn.	Ol. Grn.	Rd. Brn.	Brn.	Rd. Brn.	Lt. Grn.	Grn.
11. Dewlap Wax	8	5	6	4	6	7	1	7
12. Dewlap Shape	C	C	G	B	G	G	A	C
13. Collar Hair	5	4	6	6	5	5	1	6
14. Clinging of Trash	6	7	5	2	8	4	8	7
15. Stalk Diameter	5	5	5	4	5	4	6	5
16. Stalk Shape	2	5	2	3	7	2	3	6
17. Stalk Wax	6, no	7, no	9, yes	8, yes	8, yes	7, no	5, yes	5, no
18. Internode Pattern	F	D	D	D	D	F	F	D
19. Type of Growth Ring	1	1	1	1	1	1	1	1
20. Internode Color	Rd.pur/pur	Yw.Grn/Grn	White	Crm./Crm.	Brz/Lt.Grn	Crm/Yw.Grn	Tan/Grn.	Br2/Lt.Grn
21. Root Band Color	Yw.Grn.	Grn.	Cream	Lt. Grn.	Yw. Grn.	Yw. Grn.	Crm.	Ol. Grn.
22. Growth Cracks	2	1	0	0	1	0	6	1
23. Bud Shape	G	H	G	C	D	H	G	D
24. Bud Groove	4	1	4	4	1	2	1	2
25. Tube/pith	Tube	Tube		Big Tube	Tube	Tube		